Vol. 6, No. 5 MAY, 1931

The FLEET OWNER

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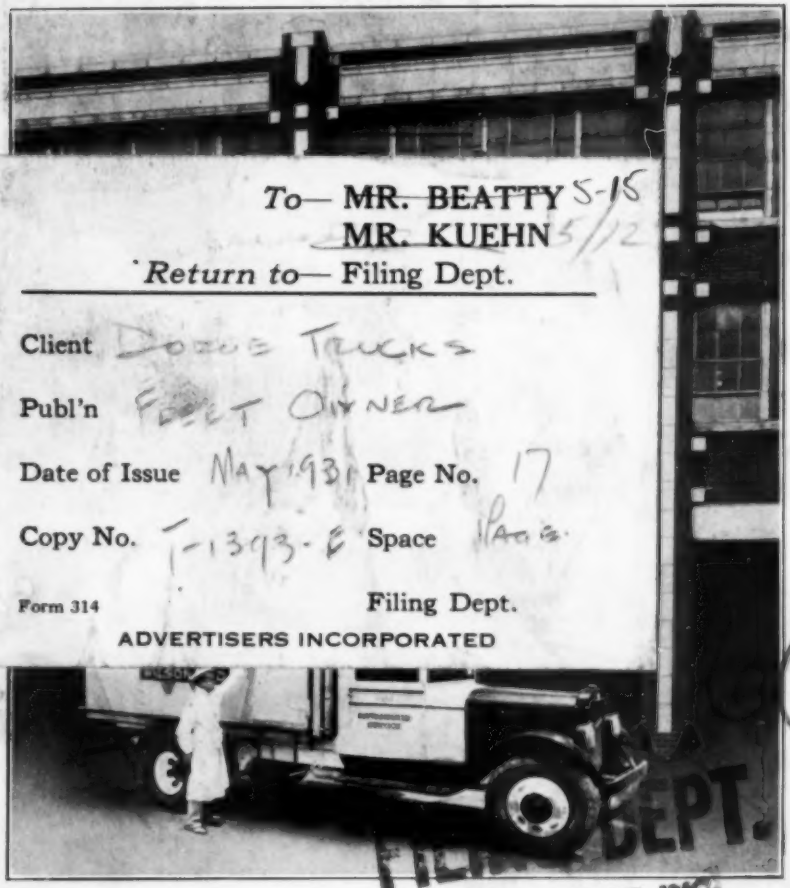

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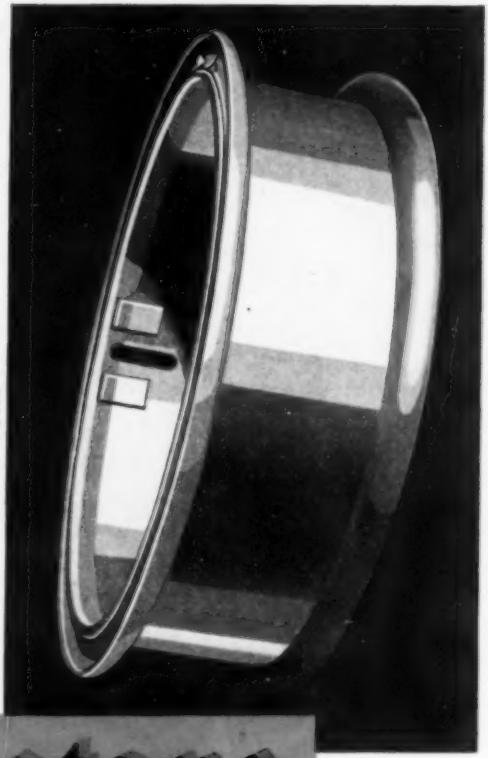

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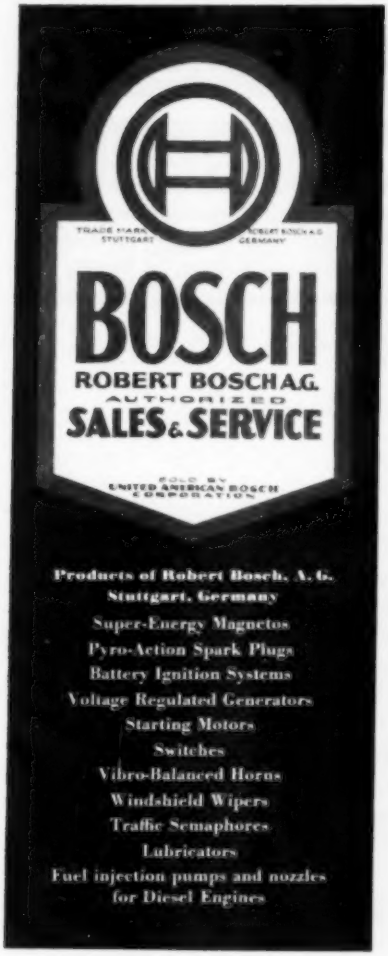

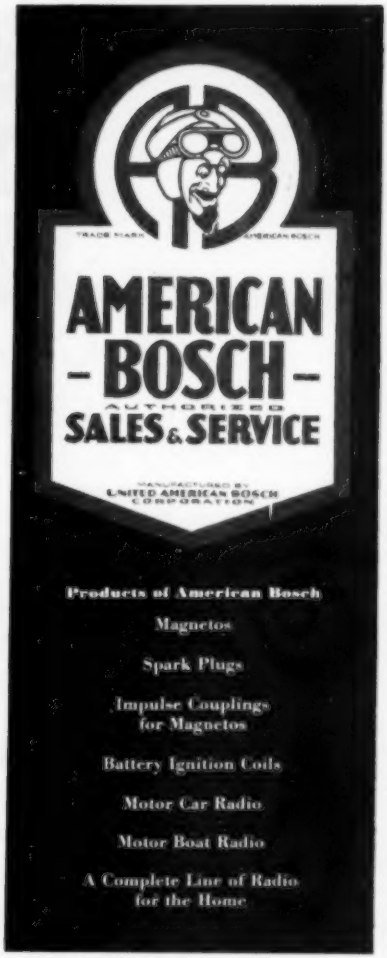

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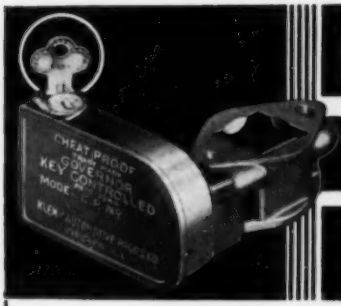

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HENRY CLAY FISCHER
Editor

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Match the Oil to the Engine's Needs

No Two Engines Are Alike in Lubrication Requirements . . . VISCO-METER Shows What Oil To Use

Every engine makes different demands upon a lubricant, depending upon bearing and cylinder clearances, running temperatures, age of the engine, make etc. Every engine, therefore, requires a specific lubricant.

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The FLEET OWNER

"For Those Who Service Their Own"

PUBLISHED monthly in the interests of Automotive Fleet Owners who maintain their own Repair and Service Shops, and devoted to the better operation and maintenance of Trucks, Passenger Cars, Busses and Taxis.

HENRY CLAY FISCHER, Editor

Vol. 6 New York, May, 1931 No. 5

Helping to Solve a Common Problem

THAT the all-too-common problem of "oil-pumping" has presented itself at some time or other in the career of every seasoned fleet maintenance man, is a popular belief. At least some kind of an oil-pumper has been encountered by all of us. Perhaps it was an old engine that had worn itself out and was easy to cure by a complete reconditioning of the cylinders. Maybe it was only a partially worn-out job that was fixed up with a set of regular or patented piston rings. Then again, it might have been a new job that pumped oil since the day it left the factory. On the other hand, it might have even been a newly "reconditioned" job that turned out to be a worse oil-pumper than before.

To some, the problem of oil-pumping has been a comparatively new obstacle in the path of good truck or bus performance, but to the seasoned veteran of this business it might be included as "all in the day's work."

Regardless of your previous experiences with oil-pumpers, we feel certain that the article on this subject appearing elsewhere in this issue will have a widespread appeal to *all* of our readers, in-

asmuch as it *does contain* many *new* slants on the subject, some of which, we might venture to wager, have never been dreamed of before, as being likely causes of the evil of oil-pumping.

For the foregoing very obvious reasons, we take pleasure this month in offering such a complete treatise on this pertinent subject. Our suggestion is that you read every word of the article. Should anything therein appear not clear or incoherent, we shall be glad to take up with the author any part or parts of it that you may request; also any specific problems of your own that you have been unable to lick single-handed.

The Cover Picture

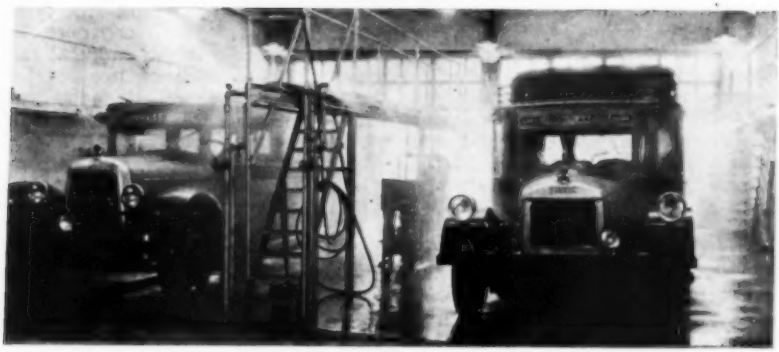
WITH the coming of warmer weather there will be seen an increasing use of refrigerator-type truck bodies in those fields where it is necessary to transport merchandise of a highly perishable nature. In the early days of truck transportation, the only refrigerated bodies we can remember were the ice-cream vans. Compare this situation, if you can, with the present-day usage of refrigerated bodies in many lines of business, such as dairies, butchers, packers, florists, etc.

The picture on our front cover is representative, indeed, of this trend. The details of this body are not available at the present writing. Modern refrigerator bodies, however, can maintain an average temperature of from 40 to 55 degrees Fahrenheit, depending of course on the particular requirements. Lower temperatures, we believe, can be maintained.

One particular refrigerator body with which we are familiar, is made small enough so that it can be mounted even on any type of passenger car chassis. It weighs around 2,000 lbs. Larger ones, of course, are somewhat easier to fabricate and apply.

If you are in any line of business requiring the economical transportation of perishable products, and have had previous experiences in which spoilage played a big part, it will pay you to investigate this comparatively new trend in modern truck transportation.

The Editor



Self-Maintenance Pays

High Cost of Greyhound's Specially Designed Maintenance Plant is Offset by Service Savings

By Mort. J. Donoghue*

IS the relatively high cost of a specially designed and constructed motorcoach shop and maintenance plant justified from the viewpoint of the large investment involved?

The question has been emphatically answered in the affirmative by Pacific Greyhound Lines which recently placed in operation a $200,000 plant in Portland, Oregon.

Not only is the plant showing a profitable return on the investment, on the basis of savings in rentals, but the speeding up of maintenance operations, due to factory-production principles and the installation of modern equipment designed for the particular need of motorcoach maintenance, has effected considerable economies.

These economies are due, primarily, to the elimination of virtually all outside maintenance labor charges and the speeding up of coach repairs, enabling equipment to be more speedily returned to operation and revenue production.

Architects of the building consulted with experienced motorcoach maintenance engineers in planning the layout of the shop floor area, with the result that the "straight line" maintenance system was worked out to provide for washing, servicing, greasing and inspection of coaches in a systematized manner that eliminates almost all lost motion.

The building itself occupies a ground space of 200 by 240 feet and is built on a plot of land measuring 200 by 294 feet. The building faces public streets on three sides and the additional ground space provides a

* *Manager of Development, Pacific Greyhound Lines, San Francisco, Calif.*

private street in the rear of the building measuring 54 feet in width.

The front of the building is two stories, the upper floor providing space for administrative and general offices as well as club quarters for drivers and a kitchen and cafeteria for office and mechanical forces. The second story has a floor area of 9,750 square feet.

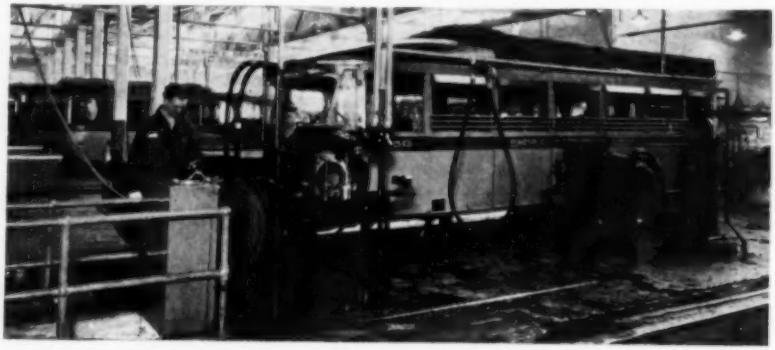
The first floor, with an area of 48,000 square feet, provides space for the following departments: wash rack, greasing and inspection pits, repair pits, machine shop, service shop, blacksmith shop, paint shop, body shop, two stock rooms, tire room, oil and grease room, battery room, electric shop, lost and found room, locker room, toilet, shower and wash room and shop offices.

Construction of the building is of reinforced concrete with steel trusses over the one-story portion. All floors are concrete and the entire first floor is treated with a metallic floor hardener to minimize dust and provide a hard wearing surface.

Motorcoaches coming in from road duty are run directly onto the wash racks, measuring 36 by 42 feet and with a capacity of two coaches at one time. Steel balconies run down either side and through the center of the wash racks between the cars. Along these balconies are spray heads so arranged that cars may be thoroughly soaked and surface dust removed before the application of a soap preparation. After washing, the cars are rinsed off with clear water. The entire process is controlled by the manipulation of valves, making the maximum time for a thorough cleansing of the coach about five minutes. The galleries permit ready access to the coach roof. (*See picture on p. 9*)

Provision is also made for the removal of grease and accumulated oil on motors by steam or hot water under 300 pounds pressure. Paint removal and chassis cleaning facilities are provided on a separate rack.

Thoroughly washed, coaches are then moved ahead over greasing pits where they are refueled, greased and



Coach in position over greasing pit, where it is refueled, greased and oil changed or replenished, whichever is necessary.

These **TWO** *belong* **TOGETHER**

IN so many words, a five ton truck needs a tire designed and built to do a five ton job.

A truck built to do a one and a half ton job must have a tire built for a one and a half ton truck.

Sizes and models are secondary to the load.

Goodrich has taken this into account in the construction of Goodrich Heavy Duty Silvertown Tires.

For the one and a half ton truck pictured here there is no tire built that is better than the 32 x 6 Silvertown designed for this particular operation. And so on right up the line for every size and type of truck.

Learn more about tires. It's a sure way to save money—big money. See the Goodrich Distributor.

BE A TRANSPORTATION EXPERT. Write for the especially prepared Goodrich booklet which is full of truck tire facts that you can put to immediate use. Tear out this page, write your name and address on the border and send it to the Truck and Bus Tire Department, The B. F. Goodrich Rubber Company, Akron, Ohio.

Goodrich HEAVY DUTY **Silvertowns**

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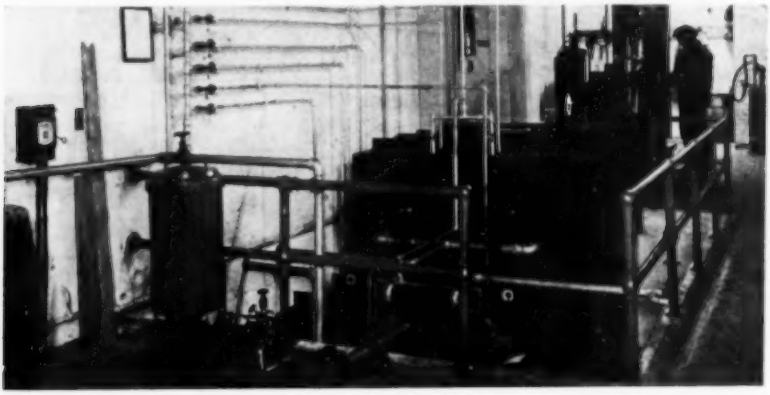
oil changed or replenished. Here, too, batteries are tested and serviced and tires inflated to proper pressure. The grease and oil supply is stored in a separate room and is forced under pressure through pipes to the greasing pits. The oil is measured through meters directly into the crankcase, thereby eliminating the use of containers as measuring devices. During the greasing and oiling service, and before the coach leaves the greasing pits, it is given a thorough inspection, one of the most important items in the entire maintenance routine.



Lubricating oil and grease storage room. In the background can be seen the apparatus for the reclaiming of used oil.

The greasing pits are equipped with a well-planned flood lighting system, with lights set back in recesses, and protected by a heavy steel screen. The inside of these recesses is painted white to afford a maximum amount of reflection. All plugs and lights are of the waterproof marine type.

The service inspection routine requires a preliminary examination of drivers' defect report, and defects shown thereon are incorporated in the shop order made out by the inspector. Interior inspection of the coach notes condition of upholstery, seats, lights, floor, paint finish and fire extinguishers. Outside inspection includes body, chassis, wheels, drive lines, motor, tires and brake testing.

Should this rigid inspection reveal no defects, the inspector signs a car clearance card and the coach is then moved forward into the storage section, ready for immediate road service.

Should the inspector find that the coach must be sent to the service shop, he makes a complete service report, including data obtained from drivers' defect card, his own inspection and from the coach service card, which is carried inside the coach and shows dates and classifications of services rendered. When the coach reaches the service shop, all pertinent data is ready for handy

Something

TO CHEW ON . . .

There is a point in the service life of every set of valves when they start on a rapid down-grade of deterioration. After that, keeping them in the motor is much more costly than scrapping them. If you count *all* your costs and your mechanics are on the job, your motors will get new valves when they need them — and new guides at the same time. Then, to get the most for your money, why not specify genuine Thompson parts?

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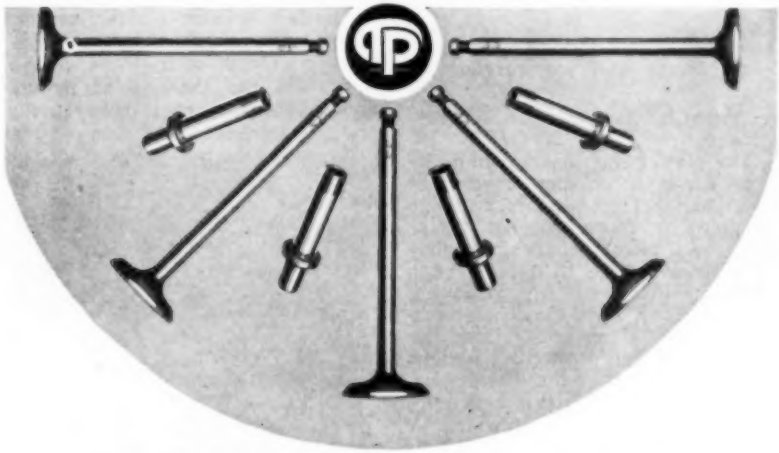


Thompson Valves and Guides; King, Shackle, Tie Rod Bolts and Bushings; Eccentric Tie Rods; Pistons and Pins; Tryon Shackles.

Thompson Valves

Always use New Guides with New Valves

Refueling motor-coach in position over greasing pit. Note the metered dispensing unit for gasoline.

reference by shop foreman and mechanics.

The service shop has accommodations for eighteen motorcoaches at one time. Service pits are available for nine of these coaches where drive lines, motors, chassis, etc., may be repaired. One of these pits is especially designed for removing and installing Twin-Coach motors.

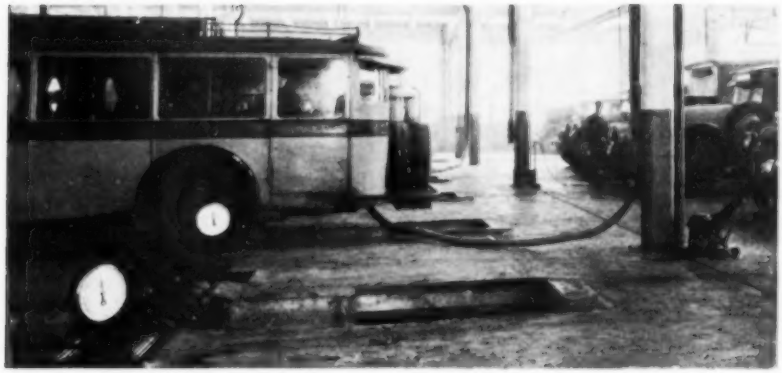
Extending along one side of the service room and connecting at right angles with each of the service pits, is a large pit 100 feet in length, 6½ feet deep and 8 feet wide. A work bench extends the full length of this connecting pit and is completely equipped with vises, bench drills and other apparatus, spaced at intervals to accommodate mechanics at work in the service pits. Permanent reinforced ramps cross this connecting pit, making it possible to drive coaches into the storage section.

Stationary service benches, 30 inches wide and eight feet long, are located between the pits on the floor level. These consist of six drawers, three on each side, to hold mechanics' tools and equipment. Location of these benches was determined after a careful study of mechanics' needs and have been placed in such position as will eliminate lost motion and conserve, as much as possible, time and effort in motor repair work.

Between and at the end of the service pits, four-inch exhaust pipes have been installed to extend through the roof. Connections are made between these pipes and motor exhausts to carry off all gases when motors are run in testing operations.

Another feature of the service room is the overhead monorail system, equipped with trolleys and hoists for the handling of motors and other heavy parts between the

Lady member of accounting force showing one of the drivers how to use new drivers' inspection mirror.



Rear view of service pits. Note power floor-cleaner at extreme right, brake tester at left, and hose for carrying off exhaust fumes, in center.

service shop and the machine shop or the parts-cleaning room.

The machine shop and unit repair shop have a floor space of 3500 square feet. Both shops are equipped with all machinery necessary to completely overhaul and maintain motors, air compressors, differentials, axles, transmissions, and, in short, every unit on the motorcoach with the exception of spring making and spring repair. Included in the machinery are lathes, cylinder boring, line boring, crankshaft grinding machines and drill presses.

The welding or blacksmith shop is equipped to handle aluminum and cast-iron welding, such as motor bases, motor blocks, motor heads and similar work. Rebabbitting of bearings is also done here. The equipment includes a forge, gas oven, air hammers and all other necessary tools.

The electrical shop is completely equipped with every device needed for the testing and repair of electrical units such as generators, starters and ignition units. A separate battery room is equipped with facilities for construction of new batteries as well as repairing old batteries and recharging.

In the body shop, provision is made for working on three coaches at the same time. Equipment here consists of a universal wood working machine, a combination of band saw, planer, shaper and mortising and boring machine; a 22-inch drill press; a metal break; a metal shears; a metal bending machine; a glass grinding and polishing machine and other equipment necessary to body repair or construction work. Trimming work is done on a mezzanine floor over the tire and oil rooms and connecting with the body shop.

The paint shop will accommodate four coaches at one time and is fitted with the injector type of exhaust ventilation. Air ducts are made of heavy galvanized sheet iron, having flanged and bolted

clean-outs every ten feet. These clean-outs are of sufficient size to admit a man's body. On one side, the air is taken from near the ceiling and on the other side, from the floor. A hand-controlled water spray system is installed inside each air duct and the entire paint shop is equipped with an automatic sprinkler system. All motors operating the unit heater and the exhaust fan are located outside the paint shop.

Two stock rooms are maintained. One is operated by the Stores Department of Pacific Greyhound Lines, and through this store all spare units are handled and proper charges made. This also applies to shop tools. The other stock room is operated by the C. H. Will Motors Corporation, under contract with Pacific Greyhound Lines to maintain a complete stock of parts to care for requirements of Will coaches operated on Oregon Stages Division of Pacific Greyhound Lines.

The oil and grease storage room, 16 by 50 feet, holds four oil storage tanks, each of 400 gallons capacity, and two tanks of 300 gallons capacity each. All are installed in a pit nine feet deep. Two of these tanks are arranged for storage of used oil drained from motors; two tanks are for the storage of reclaimed oil and two tanks are for storage of two grades of new oil. Each tank is equipped with gauges indicating the number of gallons of oil in the tank at all times. At the grease pits, a funnel on a swing joint is installed and the used oil from the motorcoaches is drained by gravity through a line into one of these tanks. From this tank, the used oil is pumped through a filtering plant where it is electrically heated, washed and separated and then discharged into another tank. This oil is then forced by air pressure to the grease pits where buses are served, and it is metered as served. Another connection leads to a service station outside the building, where coaches may be serviced without entering the pits.

(*Please turn to page 60*)

Section of paint shop wherein two coaches are undergoing redecorating. Note the large air-ducts at right.

. . . FOR BIG LOADS, HEAVY LOADS . . YOU NEED *HEAVY-DUTY* TRUCKS

Whatever your heavy-duty hauling needs may be . . . whether your loads be wet gravel or boilers, steel girders or bank vaults . . . whether you must head up steep hills often or over unimproved roads daily . . . there is a Dodge Heavy-Duty Truck for your job. A Dodge Truck that's modern. That's precision-built throughout and correctly balanced part to part for longer life. A truck that's dependable. That's economical. That will work for you and earn for you as no other truck will do. » » See your Dodge Brothers dealer. See and test the Dodge Heavy-Duty Truck that fits your needs. You can buy it complete with standard or special body. You will find it an exceptional value—a loyal worker, a consistent earner.

THE COMPLETE LINE OF DODGE TRUCKS RANGES IN PAYLOAD CAPACITIES FROM 1,200 TO 11,175 POUNDS—PRICED, CHASSIS F. O. B. DETROIT, FROM $435 TO $2695, INCLUDING THE ½-TON CHASSIS AT $595

DEPENDABLE DODGE TRUCKS

Why Engines *Pump* Oil

An Analysis of the Various Causes of Excessive Oil Consumption and How to Remedy Them

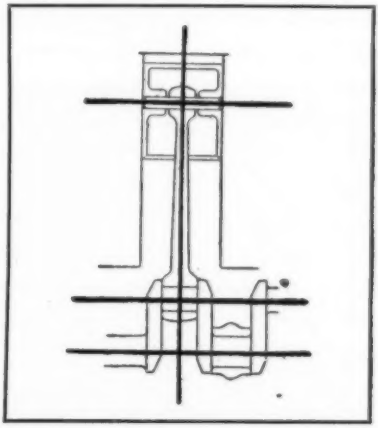
By Chas. A. Marien*

BEFORE taking up the various causes of oil pumping or excessive use of oil, it might not be amiss to point out the fact that a small amount of oil passing by the rings into the combustion chamber, actually develops into excessive consumption of oil, and it is therefore this small amount of oil, in excess of the normal consumption, that we are really called upon to control. In fact, excessive oil consumption is a sensitive proposition, and a very small amount of oil passing by the piston with each stroke will cause excessive consumption. The amount of oil that causes oil consumption is in many cases very minute, and becomes a sensitive problem to control.

For example, if we were to drive, we will say an ordinary six-cylinder car for a distance of about 300 miles, we would get 4,838,400 piston strokes, and if one drop of oil were passed into the combustion chamber at every suction stroke of the pistons, the oil consumption would amount to 21 gallons for the trip.

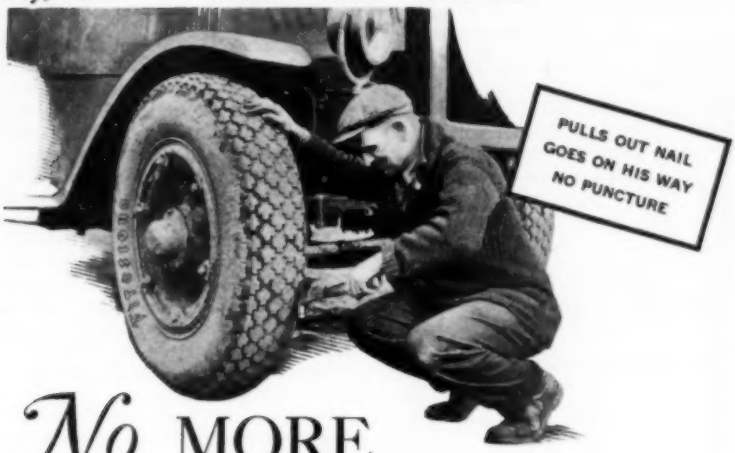
One of the first fundamental conditions that we must have in a motor to prevent the excessive use of oil is perfect alignment and proper clearance throughout. Starting at the top of the motor, we must have piston rings which in themselves are perfectly machined—meaning that they must be round and the sides must be flat and square with the face. The pistons must be machined perfectly round, the piston grooves parallel to a plane perpendicular to the axis of the piston, and the sides of the piston grooves or ring lands must be perfectly flat and true. Then the next and all-important item is the pinhole, which must be perfectly square with the body of the piston.

Next, the cylinder bores must be straight and round, and in vertical alignment with the crankshaft. In cases where the crankcase is not integral with the cylinder block, it



Perfect alignment is one of the necessary factors in preventing oil-pumping.

* *Research Engineer for Ramsey Accessories Manufacturing Corporation, St. Louis, Mo.*



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This new tube prevents 95% of all flats, and adds miles of life to your tires.

SUPPOSE this were one of your trucks. A ten-penny nail has just gone clear through both tire and tube. Change tires? Delay? Expense? No indeed. The driver will simply pull out the nail and go on his way.

There's no flat tire, no leakage of air, because the truck is equipped with Firestone Puncture-Proof Tubes.

Firestone Puncture-Proof Tubes are not an experiment. They are making expensive delays a thing of the past for hundreds of truck owners. Just two instances:

On more than 1500 vehicles, operating in twelve different cities, Firestone Puncture-Proof Tubes reduced the number of flats from one in each two thousand miles, to one in each twenty thousand miles.

Tests made on 34 urban coaches showed a total of only 45 flats in three and a half million tire miles, or an average of only one flat in each eighty thousand tire miles.

It will pay you to phone your Firestone dealer today. Ask him to show you a Firestone Puncture-Proof Tube. Specify Firestone Gum-Dipped Tires, Firestone Puncture-Proof Tubes and Firestone Rims when you purchase new equipment.

A thick, extra layer of gum rubber springs together; prevents even nail hole from causing leakage of air.

Firestone PUNCTURE PROOF TUBES

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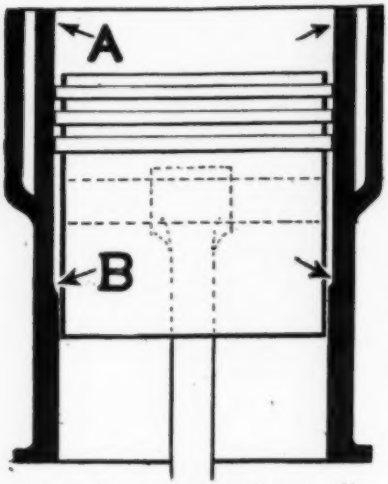


Illustrating wear in wall extending throughout "ring travel." Oil pumping can be caused by the oil being pocketed at B and forced up behind the rings into the combustion chamber A, on the downstroke of the piston.

is important that the crankcase, cylinder base and cylinder block base must also be in perfect alignment with the cylinder bores and crankshaft. The pistons, pins and rings, and connecting rods, being the operating component part of the motor, must all be in *perfect alignment* with the cylinder bores and crankshaft. With proper alignment, and when proper clearances have been allowed, the motor will operate perfectly without friction and will very seldom give any trouble on account of excessive consumption of oil.

In presenting most of the important causes of oil pumping, we shall not take the time to point out all of the corrections necessary to overcome these causes, because it is (or should be) very apparent to every one in the automotive trade as to just what is to be done, once the cause of the condition has been established.

The late development of the high speed, high compression motor has brought about new problems for the control of excessive oil consumption, due to the fact that the pistons reciprocate at a very high rate of speed, and in their down stroke, the oil piles up against the edge of the piston ring and tends to collapse the ring, allowing the oil to pass by the face of the ring.

A number of manufacturers, recently, have designed their pistons to take four ⅛ in. rings, instead of three 3/16 in. rings, using two oil rings and two compression rings. It seems evident that, from their experience, it was necessary to do this in order to control the excessive oil consumption. The narrower rings were substituted for the wider ones, for the reason that the narrow edge will wipe the oil easier than the wide edge. In this connection it also seems evident that a more equal radial pressure will be necessary, than that which we have had in the past.

A great deal of oil pumping and excessive consumption of oil is due directly to the condition of the cylinder bores—not only in worn cylinders, but in new and reconditioned cylinders as well. In the case of old cylinders, we have a tapered and out-of-round cylinder, due to wear, and cylinders with depressions worn into their sides, caused by pistons slapping. In the other case, we have a cylinder with proper alignment and dimensions when cool, but which assumes a distorted condition after becoming heated.

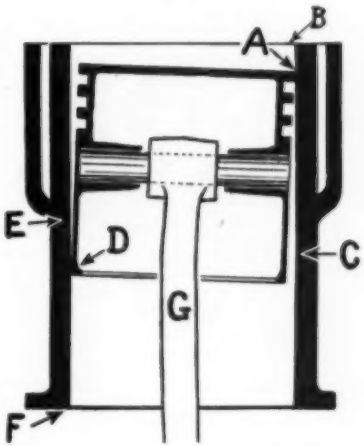
Experiments have shown that new

and reconditioned cylinders distort on account of heat as much as .0025 in. at the upper end, causing a lateral or oscillating movement of the piston ring. It is obvious, therefore, when the rapid reciprocation of the piston is considered, that this oscillating movement of the ring will tend to destroy the piston ring itself, as well as wear the piston grooves and cylinder walls. It is then only a matter of time, or miles, when excessive oil consumption will set in.

A great many pistons are improperly designed. Some pistons will not properly control the oil even though the pistons themselves be fitted with the right clearance, properly machined and the rings perfectly fitted. As an example, I was recently called in on a job that had been reconditioned, and upon examination I found that the cylinder bores were perfect, pistons properly fitted and seated, and still this engine was consuming an excessive amount of oil at high speeds. This particular design of piston had two rings at the top and one at the skirt. The skirt groove was drilled with large drain holes and was fitted with a double-vent oil ring, but the motor, despite this design, used an excessive amount of oil. The reason why the oil was getting by this piston was that the lower ring at the top of the piston, in its rapid reciprocation, piled up the oil and forced it by the face of the ring. By simply beveling the lower edge of the ring land and drilling a few relief holes, we corrected the excessive consumption.

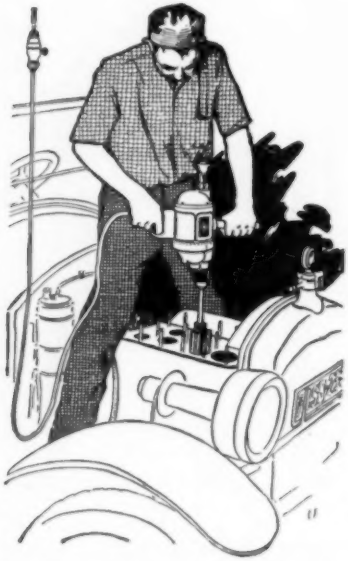
I have also found other defects in piston design. If the piston grooves are snaky or tapered, either through improper machining or abnormal wear, this will cause an imperfect seat between the piston ring and the ring land, which will allow the oil to travel behind the piston ring and upward into the combustion chamber, through a pumping action. I have also found in many cases that if the bottom edge of the pistons was rounded or tapered, this would also cause an oil pumping condition.

In grinding a piston, the abrasive wheel should not be allowed to run off the edge of the piston. If it is allowed to run off, it will, in its return, grind the lower edge of the piston several thousandths smaller than the body of the piston, for a distance of a quarter to a half inch. This will allow the pistons to ride over the oil and allow the oil to work up. Consequently the rings will not control the oil.



Exaggerated example of a bent connecting-rod, showing extreme cylinder wear is caused at A and D. Oil pockets are at C and E. Besides an annoying knock, a cylinder in this condition will soon pump oil.

It is unfortunate that because of the expansion at the top of the piston, we have to allow a great deal of ring-land clearance, and especially so in aluminum alloy pistons, the land clearance in alloy pistons being several times as much as in cast-iron pistons. This of course, does not give the piston its proper support in its entire length, particularly depending upon the design of the piston, and very soon they begin to teeter or rock in the cylinders. This causes rapid wear to the pistons, cylinder walls and piston rings, creating depressions in the cylinder walls, "barreled-faced" piston rings and excessive clearances, which in turn bring about a condition where we have a greater film of oil to control, and consequently, excessive consumption of oil.

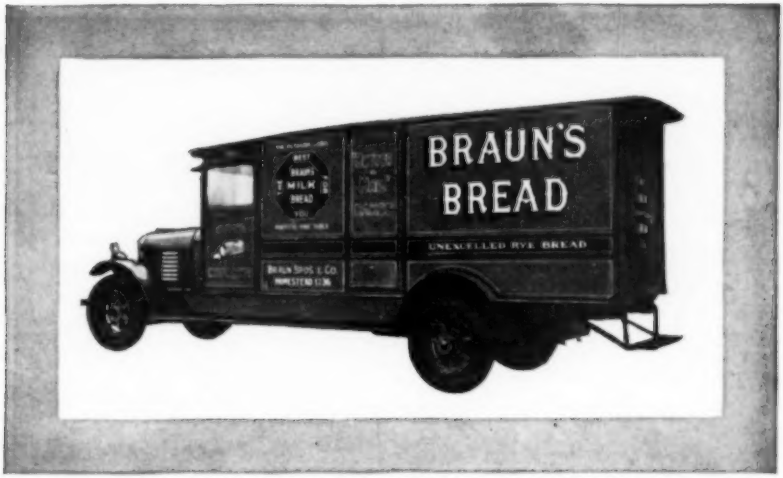


Sometimes a reconditioned job will turn out to be an oil-pumper. Read this article and find out the reasons why.

Of course, we all understand that pistons should be fitted with not too much clearance, as too much clearance between pistons and cylinder walls, either because of wear or too loose a fit, will place a burden on the rings. When the rings are overburdened there is likely to be lack of control on their part, and thus excessive consumption of oil. Practically all pistons are "relieved" to prevent scoring, due to unequal expansion of the pistons. In many cases engines pump oil or use an excessive amount of it, due to oil accumulating in the relieved portion of the piston. This condition has lately been materially corrected by drilling drain holes at the bottom of the relief.

Very often oil pumping is caused by the pistons being out of alignment with the crankshaft and cylinder bores, either through inaccurate machining of the pistons, or twisted and out-of-line connecting rods. These conditions allow the oil to "pocket" on one side of the piston and at the same time throwing the face of the rings out of contact with the cylinder wall, which will rapidly wear the cylinder and "barrel-face" the piston rings.

Piston rings are the main factor for controlling oil. Therefore, if we have snaky piston rings, or rings that are out-of-round, not flat and face square to each other, rings of insufficient tension or rings of unequal radial wall tension, either through wear or inaccurate machining, we are likely to have excessive oil consumption. Any one of these factors may be the cause of "oil pumping."



Alcoa Aluminum cut the weight of this Bread Truck 1,600 lbs. . . Now tires go nearly twice as far

Here is an incident that shows just how the reduction of dead-load in truck bodies made of Alcoa Aluminum, produces extra profits for truck operators.

Braun Brothers & Company, bakers of Pittsburgh, replaced their old truck body of heavy construction with one of Alcoa Aluminum. The result was a saving of 1,600 lbs.

But bread is light. To pile on 1,600 lbs. more bread—almost 1,600 loaves—would require too large a body. So, the same size body was used—but, built of Alcoa Aluminum, it was 4/5 of a ton lighter. Tire mileage jumped from 8,000 to 15,000 miles—almost double. Gasoline and oil were saved as well.

In all kinds of trucking, savings like these are being effected through the use of Alcoa Aluminum alloy bodies. That's why there is a constantly increasing demand for them.

Standard structural shapes of the strong alloys of Alcoa Aluminum, equivalent to structural steel in strength but only 1/3 its weight, are carried in stock. Sheets, plates, molding, rivets, bolts and screws are also available.

The booklet, "Alcoa Aluminum For Truck Bodies," contains the histories and operating data of many aluminum bodies now in use. It also has working drawings and bills of material for several different types of bodies. Write for it. ALUMINUM COMPANY of AMERICA: 2461 Oliver Building, PITTSBURGH, PENNA.

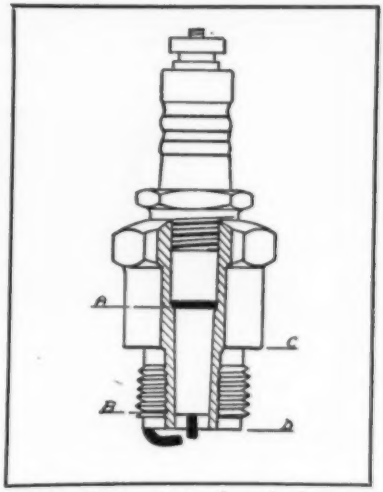
ALCOA ALUMINUM

Rings which are too tight in the piston ring grooves are also responsible for oil pumping, for the reason that if a ring does not have free radial movement in the piston groove, it will not follow the cylinder wall, due to its rapid reciprocation and consequently let the oil pass by the face of the rings.

When we get too much clearance between the piston and cylinder, it is only natural that we carry a greater film of oil. Then when the explosion takes place and we drive the piston against the wall, we create an "oil-pressure" and the rings not only have to withhold this oil pressure, but they also have to scrape down this excess amount of oil. Therefore if the rings do not have sufficient tension, and there is not sufficient relief for the excessive oil, the oil will not only pass by, underneath the rings, but the rings will also collapse and let the oil by the face of the ring.

The vented and scraper types of oil rings that are now so universally used, together with drain holes drilled in the ring groove back of the oil ring, tend to correct this trouble, provided, of course, that the condition of the motor is not worn beyond its abnormal clearances.

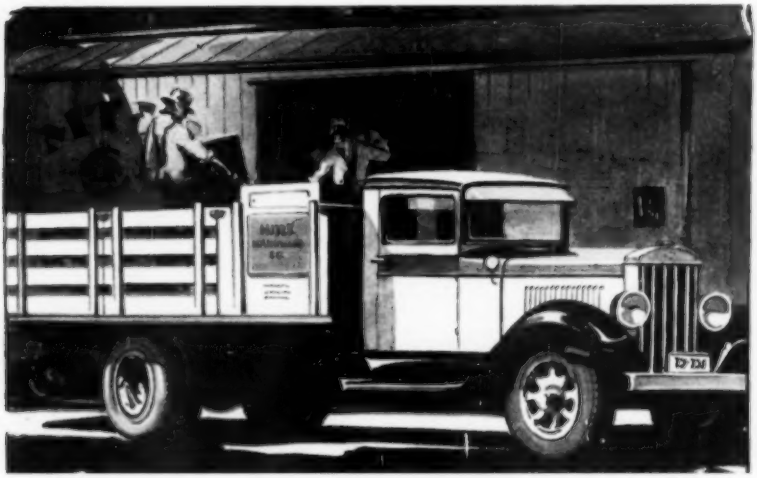
One of the major and underlying causes of oil pumping is the source of lubrication which takes place in the crankcase, or by force-feed lubrication through the bearings. I would say that in about one-half of the cases reported as oil pumpers, the trouble originates *below* the cylinders. We all know that if we take an engine that is functioning properly, not using an excessive amount of oil, and then over-fill the crankcase, thus splashing too much oil into the cylinders, that we immediately cause the engine to throw out clouds of smoke. This proves that we cannot control the oil beyond a certain point with piston rings, unless we would give the piston ring too much tension, which would in turn give us other troubles, such as lack of acceleration, lack of speed, excessive cylinder wear and overheating.



Slight oil-pumpers that foul spark plugs can be made to run better by installing "hot-running" plugs.

Since there is a limit to the amount of tension that we can expect in the piston ring, we must control the amount of oil which is carried through the bearings from the crankcase into the cylinders. Therefore, it is obvious that a great many oil pumpers are directly caused by too high an oil level in the crankcase, as in the older motors, and too much pressure in the later type of motors. If not too much pressure, then leaky bearings, due to

(*Please turn to page 64*)



18 Years of Reliable Service Behind—Prolonged Years of Even Finer Service Ahead

Commercial transportation standards are invariably set by Reo. Eighteen years ago, Reo first introduced light, more-power-for-weight, speedier, safer, lower-cost SPEED WAGONS, and has maintained engineering dominance ever since.

Hundreds of thousands of REO SPEED WAGONS and TRUCKS have been placed in operation in 64 countries, hauling structural steel down congested Broadway, bringing Brazilian coffee to coastal shipping ports, or patrolling the vast desert stretches along the Great Wall of China!

The same story of day-in-day-out reliability and astounding infrequency of repair has travelled the world around, and has won universal acceptance for REO products.

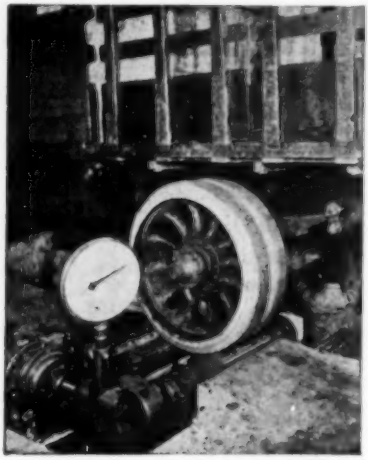
In face of these irrefutable results, the REO is deserving of a lasting place in your system of transportation service.

REO MOTOR CAR COMPANY, LANSING, MICHIGAN

SPEED WAGONS REO AND TRUCKS

Common

Brake Troubles



Ninety Per Cent of All Complaints Not Caused by Brake Linings, Engineer Holds

IMPROPER use of brakes immediately after new brake linings have been installed, improper installation of brake linings because of the lack of modern machinery in service stations, and the use of a poor grade of steel for brake drums on many inexpensive makes of cars, are given as the principal reasons for 90 per cent of common brake troubles, according to a paper presented by John Wright of the Russell Manufacturing Company, Middletown, Conn., before a meeting of the Northwest Section of the Society of Automotive Engineers, in Seattle, Wash., recently held.

"The question of brakes and the evils that are connected with their maintenance is a real problem confronting the automotive industry," states Mr. Wright's paper. The findings are based on engineering study and scientific surveys conducted by his Company, manufacturers of brake linings and other products.

"I believe," he declares, "that under proper working and service conditions there are a good number of brake linings that will give satisfactory service. Fully 90 per cent of the brake troubles are caused by factors other than the brake lining itself. Most of the scoring is done while the job is comparatively new.

"An average light passenger car can develop a speed of 50 m.p.h. in approximately twenty seconds and requires 55 h. p. to do so. This same car can be brought to a stop in one-third of the time taken to develop the road speed mentioned. In other words, over three times the 'reverse horse power' is required to stop the car as to attain the speed. It has been estimated that 3,000 degrees Fahrenheit are developed in the braking effort, and under this condition a scoring

17 Years of Service

Three of a fleet of thirteen Continental-powered Corbitt trucks owned by the city of Raleigh, North Carolina. Eight of these trucks are used in the Sanitary Department and equipped with dump bodies. Five are used in the excavating and repairing division. The city of Raleigh has used Continental-powered Corbitt trucks for 17 years.

Continental engines are built to withstand the test of years — of rough treatment — of overloading — and still maintain their reputation for continuous, economic operation and service. All Continental engines are protected with pressure feed lubrication systems — and are designed with extra strength parts — heavy bearings and other features that add life and service. Cities all over the country recognize the need for Continental engines in municipal business.

CONTINENTAL MOTORS CORPORATION

Offices: **Detroit, Michigan, U. S. A.**
Factories: **Detroit and Muskegon**

CONTINENTAL MOTORS · AMERICA'S STANDARD

Continental Engines

action may be started.

"It is common occurrence to score brake drums just after the brakes have been relined, by improper use of the brakes before the lining has become properly seated, and therefore before the maximum bearing surface is in use. The drum rides on the high spots of the lining and small particles of steel come to the fusing point and begin the destructive work. Brake scoring is unusual on a new car, because of the care taken to drive at a reasonable speed during the breaking-in period. Care subsequent to relining would result in fewer complaints on the grounds of drum scoring.

"A well equipped shop doing brake work should have the following equipment in order to do satisfactory brake work: drum lathe, drilling and riveting machine, shoe grinding machine and a drum gauge, in addition to the necessary jacks, hand-tools, etc. Despite the opinions to the contrary, a brake tester or equalization machine is desirable and makes possible better brake adjustment.

Brake-drum gauges have become very necessary with the advent of internal-expanding brakes. They are used for checking the drums for concentricity and roundness.

"The brake shoe grinder takes the high spots from the lining before being used by the driver, and provides more contact area with the drum. Some machines provide 100 per cent circumference contact. The only factor which is lacking is that these machines do not guarantee parallelism with the face of the drum. Many of the difficulties of the brake situation will be overcome when a machine incorporating this feature is developed, providing that the drum is in perfect condition when the brakes are applied and that the job is broken in before the brakes are applied too severely.

"A brake drum gauge, used properly and consistently, will pay for itself in many ways. The instrument threads on to the axle of the car and gives a micrometer reading of the drum radius. With this reading the brake shoes can be placed in position and accurate adjustments for clearances made before the wheel is installed.

"Without the equipment mentioned much of the mechanics' work becomes mere guesswork. A practically perfect job may be obtained by 'bluing' the lining and fitting, as is the usual practice in hand-fitting bearings. This method, however, involves much time and labor. It is false economy to install cheap or inferior brake drums or poor lining. The best is the cheapest in the long run."

1 brake drum replacement
INSTEAD OF
5
LEMPCO GUN ALLOY
"BUY LEMPCO GUN ALLOYS—they cost you NOTHING" might well be our slogan. For Gun Alloys save far more than their cost because they eliminate 4 to 5 brake overhauls. In cold cash, Gun Alloys reduce brake maintenance costs something like $150.
AND HERE'S WHY: Gun Alloys outlast ordinary drums 4 to 5 times. That means ordinary drums have to be replaced 4 to 5 times more often. Every time a brake drum is replaced it costs around $35 for labor, brake lining and other parts. So by eliminating 4 to 5 brake replacements Gun Alloys reduce drum replacement costs at least $150.
Then take into account Gun Alloys increase brake lining life 200% to 300% and eliminate 75% of all brake adjustments, and you'll readily understand why the Purities Baking Company—who operate a fleet of 2,257 vehicles—are enthusiastic about them.
One set will convince you nothing equals Gun Alloys. Heat won't distort or the toughest brake lining score these extraordinary drums. Therefore, Gun Alloys also guarantee a braking action that will avert accidents. Made for every truck, bus and taxicab in operation.
LEMPCO PRODUCTS INC.
BEDFORD, OHIO
Branch Offices and Warehouses:
NEW YORK 250-51 W. 54th St.
CHICAGO 321 W. Polk St.
LOS ANGELES 244 West 10th St.
ATLANTA 279 Ivy Street
DALLAS 2705 Wilson St.
SAN FRANCISCO 628 Brannan Street
KANSAS CITY, 14th and Oak Streets
LEMPCO GUN ALLOY BRAKE DRUMS

Caring *for* Emergencies

A Combination Wrecking-Car and Snow-Plow That Efficiently Meets Our Road Requirements

By H. C. Reynolds*

TO handle disabled motor coaches of our present type, and also to meet various conditions of heavy snow, the Washington Motor Coach Company have found it advisable to provide a piece of equipment which is capable of caring for these emergencies in a satisfactory and efficient manner. For this purpose an FWD truck chassis of 3½-ton capacity was purchased. This chassis was especially equipped with a larger motor which develops 102 horsepower and gives the truck much more than the rated 3½-ton capacity.

The transmission is of the constant mesh type with five forward speeds and one reverse. The differential is geared 7.35 to 1 which at 2,000 r.p.m. gives a speed of 35 miles per hour. This truck, of course, is driven through all four wheels and there is a differential locking control on the inside of the cab which, when in use, makes it impossible for any one wheel to spin. A Wausau Snow Plow of the V-type is mounted on the front of this truck and its action controlled from the inside of the cab. This snow plow may be either attached or detached in not more than 10 minutes time, so that the truck is available at practically any time for either snow plow or ordinary service duty.

The body proper of this truck was designed and built in the Washington Motor Coach shops in Ellensburg, and many unusual features have been incorporated in its construction. The body is divided

(*Please turn to page 59*)

* *Traffic Manager, Washington Motor Coach System, Seattle, Wash.*

A SOLUTION TO THE TWO GREATEST DRIVING PERILS!

(1) . . . Danger from flying glass. Protex Glass cannot fly! In case of severe accident, if the glass cracks, these fine horizontal nichrome wires will hold the pieces safely in the frame. Consider this when you equip your car or fleet—for 65% of all collision injuries are due to flying glass!

(2). . . Blind driving in bad winter weather, when sleet, snow, ice-forming rain impair your windshield's clear vision.

The Protex Glass Company has perfected a method to eliminate this blind-driving hazard. By connecting the fine nichrome wires imbedded in Protex Sleet-Proof Glass to the storage battery, the glass can be heated sufficiently to prevent sleet, snow or ice from adhering to it. The method is simple and practical, and consumes a negligible amount of current.

Protex Glass is solid plate glass . . . neither time nor exposure to heat or moisture can effect its visibility.

Investigate!

Protex GLASS for SAFETY

Write for descriptive literature

PROTEX GLASS COMPANY

220 FIFTH AVENUE NEW YORK, N. Y.

Advertising *in* Taxicabs

New Device, Offered to Taxicab Fleet Operators, Should Provide Additional Operating Revenue

A NEW advertising medium will shortly make its debut in New York City. Negotiations have just been completed for equipping a fleet of 1,000 taxicabs with a mechanical device which will flash before the eyes of passengers a continuous program of illuminated advertisements.

Parties to the negotiations are Terminal Cab Company, a subsidiary of General Motors Truck Co.; Motor Car Advertising Device, Inc.; owners of the patents; Trico Products Company, manufacturers of windshield wipers; and J. H. Livingston, Jr., Taxi Advertising, Inc., who will supervise world distribution of the new device.

Invented by Emanuel Dobrow, 425 Fifth Avenue, the device consists of a glass-panelled metal cylinder with a revolving axis to which is attached a series of 22 card-ads similar to those regularly appearing in motor buses.

The device is installed on the windshield in a horizontal position at the right of the driver, with the electrically-lighted interior of the cylinder visible through its glass panel. Vacuum power drawn from the taxicab motor and utilized as in most windshield wipers, rotates the mechanism within the cylinder, causing the axis to revolve in such manner that a continuous program of flood lighted ads is flashed before the passengers' eyes. The operating expense is practically nothing, according to the makers.

A program consists of 22 ads and runs its course in an average time of about 2½ minutes, during which each ad is in full view for 7 seconds. The change from one ad to the next is instantaneous, without any transitional period or any "fading" from one to another. Adding to the "attention value" of the device is the fact that the speed with which the program is run through varies like the speed of a windshield wiper, depending upon whether the taxi is laboring upgrade or loafing downhill.

It has been found that the aver-

(*Please turn to page 63*)

Never a Missing Gasket

For every car, truck, or tractor, no matter how old, there's a gasket quickly available for every OIL, GASOLINE, and WATER connection if you keep on hand a few yards of Vellumoid.

Cut or tap out gaskets as you need them. No trouble, no waiting.

And for the cars you service most, stock Vellumoid ready-cut gaskets. They do not stretch nor shrink, and are always ready for use.

Ask Your Jobber

VELLUMOID
THE REAL REPLACEMENT GASKET MATERIAL

The Vellumoid Co., Worcester, Mass.

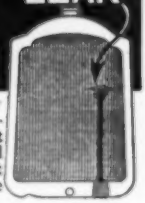
GUARANTEED PARTS

B-N PINS DALL PISTONS

More Mileage Less Expense

DALL MOTOR PARTS CO.
Cleveland, Ohio
BURGESS-NORTON MFG. CO.
Geneva, Ill.

STOP THAT LEAK WITH SMOOTH-ON No. 1



YOU can apply Smooth-On with radiator full or empty, hot or cold, without removal from the car and without putting anything inside that clogs the circulation.

Merely roll the Smooth-On into a stiff putty, press it against and into the leak with your thumb or pack it into the defect with a knife blade or screw-driver, and scrape off the excess. The leak will stop instantly and the repair is permanent.

Cracked Water Jackets

Water jackets of automobiles, stationary or marine gas engines which have developed long or short cracks or have even had pieces broken entirely out from freezing can be made thoroughly and lastingly serviceable by similar repair, or by applying Smooth-On under straps or a plate.

Get Smooth-On No. 1 in 7 oz.; 1-lb. or 5-lb. tins at any hardware store or if necessary direct from us.

Free Booklet

tells how to stop gas leaks from the tank, gasoline lines and exhaust system, oil leaks at gaskets and at cracks in crank or gear case. It also tells how to make headlight posts, nuts, hub caps and belts and grease cups stay tight, etc.

Mail coupon for a copy.

Write for FREE BOOK

Do it with **SMOOTH-ON**

SMOOTH-ON MFG. CO., Dept. 71,
574 Communipaw Ave., Jersey City, N. J.
Please send the free Smooth-On Repair Book.

Name .....

Address .....

5-31 .....

A Few of the Many Answers to Question No. 10

"We buy tires on a first-cost basis from local dealers and have figured our mileage costs on a basis of 14,830 miles per set of tires, which costs us $75.00, including the tubes. These figures apply to light cars that are used in hilly regions, bad roads and unpaved streets. Tube repairing is done in our own shop, but repairs to the tires are farmed out to tire shops."—*W. H. Carr, Police Department, Kansas City, Kans., operating a fleet of 13 passenger cars, 2 ambulances and 12 motorcycles.*

"Tires for our fleet are bought outright, on the basis of the cost-per-mile secured in service. Daily, weekly and monthly checks are made for various defects. We keep records of our tire mileage costs. All tire repair work is farmed out to tire shops."—*H. W. Kline, Supt., Northern States Power Co., Minneapolis, Minn., operating a fleet of 50 trucks and 200 passenger cars.*

"Our tires are purchased on the basis of quality consistent with low first cost. We keep records of tire costs and mileage obtained, but same is not available at present. All the checks listed are given attention daily and weekly, as required. We have our own tube-repair outfit, but farm out the casing work. Our entire equipment now operates on pneumatics."—*H. B. Shott, Supt. of Trans., City of Jackson, Jackson, Miss., operating a fleet of 40 trucks and 25 passenger cars.*

"We did have a tire contract, but now purchase tires outright on a basis of estimated expected mileage. Our average mileage is 16,000 miles per tread. Checks are made daily and weekly for various tire defects, which are our best safeguards against under-inflation. Some of our tires will give 25,000 miles; others but 7,000 miles. We do all small tire-repair jobs in our own shops and send the big ones."—*W. C. Burgan, Hages Ice Cream Co., San Diego, Calif., operating a fleet of 10 trucks and 8 passenger cars.*

"Our tires are purchased outright, on a first-cost basis and since our fleet consists mostly of salesmen's cars, we buy tires, etc., for them, but charge the cost to them. We make them an allowance of 6 to 8 cents per mile for mileage travelled, out of which they pay for the car and everything else."—*J. J. McGinnis, Traffic Manager, Gladding, McBean & Co., San Francisco, Calif., operating a fleet of 10 trucks and 40 passenger cars.*

"We buy tires outright on a first-cost basis. Our tire costs have been figured out to be .0088 per mile per car. The various checks are made at certain periods so that this work is done efficiently at the minimum cost. We examine all bolts and clamps after a tire has been changed; also monthly, as we check for wheel alignment, bent rims, etc. All tire repair work is farmed out."—*S. Kann Sons Co., 8th & Pa. Ave., N.W., Washington, D. C., operating a fleet of 26 trucks, 3 trailers and one tractor., J. Barker Morris, Delivery Manager.*

Question No. 11 is Important — Please Cooperate!

(Please tear out and mail to The Editor, The Fleet Owner, 90 West St., New York)

Question-of-the-Month Club

Question No. 11—Oil Changes

On what basis do you change crankcase oil? (Please check below.)

Time Basis? ..... *How Often?* .....

Mileage Basis? ..... *How Many Miles?* .....

Viscosity (body) Basis? .....

When Oil Becomes Dirty? .....

Any Other Basis? .....

What method is used to determine when it is time to change oil, aside from mileage or time basis? .....

.....

If you were sure of the lubricating quality, would you lengthen the period between oil changes? .....

How do you judge what specific kind or grade of oil is suitable for the lubrication of your fleet? .....

.....

In operating engines of the same make, have you noticed a difference in engine temperatures? ..... *A difference in oil consumption?* ..... *A difference in oil viscosity or body?* .....

To what condition do you attribute such differences? .....

.....

In using or specifying oil, do you consider such engine characteristics as age, make, type of service, mechanical condition, etc.? .....

A booklet is available, giving a practical solution to the problem of testing crank-case oil while the engine is running. Shall we send you a free copy? .....

We operate .....*Trucks;* .....*Busses* .....*Passenger Cars*

Name of Firm .....

Address .....

City and State .....

Your Name .....*Position* .....

(Please tear out and mail to The Editor, The Fleet Owner, 90 West St., New York)

Check the Tidal Wave of

Truck Taxation

Commercial Haulage is Vital to Industry and Should Not Be Subjected to Excessive Taxation

By **M. L. Pulcher**

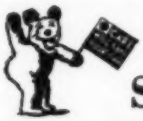
"AGE OF SPEED," is the designation frequently applied to the present era. That distinction is unquestionably justified. Eighteen-hour trains ply between New York and Chicago, with airplanes making the hop in 10 hours. Ocean liners now complete in 5 days the trip Columbus made in 71 days. In August, 1929, 61 persons aboard the Graf Zeppelin, circled the globe in 21 days. Yes, undoubtedly, in the conservation of time, this age stands out as a distinct leader.

Naturally, with all human activity geared to its present high speed, the quick movement of merchandise is likewise a most important consideration. And certainly there is no gainsaying the fact that in this the motor truck stands out as a dominant factor.

By means of the motor truck, delays in transit are reduced to the minimum. The shortest negotiable route between points is the route of the motor truck. Time lost by transfers and lay-overs is reduced to the minimum and perishable commodities are delivered to destination in the best possible condition. Merchandise is transported direct from the door of the seller to the door of the buyer. Thus the truck promotes rapid and economical distribution. It provides a ready outlet for all products, and contributes materially to lower cost of living.

M. L. Pulcher
President
Federal Motor
Truck Company

Not only as a separate and distinct transportation medium has the truck proved its worthiness, but as a supplement to other major forms of transportation. That the importance of the motor truck is fully recognized by railways, is clearly indicated by a speech made several years ago by Mr. Ralph Budd, President of the Great Northern Railways. Mr. Budd expressed the belief that the automotive industry had done more to benefit the railways than to injure them, and that railways



STOP SHIMMY

locking with the new self-

BEAR SHIMS

Only shim of its kind—ABSOLUTELY *can't lose out.* Corrects axle tilt and stops wander, weave, hard steering, and shimmy. Inserted between spring and axle by merely loosening U-bolt. Sizes for all cars, trucks and buses. Order from your jobber or send direct.

BEAR MFG. CO.
Rock Island, Ill.

TRADE MARK

PE-KO

TIRE CHANGER

Handles EVERY tire changing job because it comes completely equipped with special Ford wheel attachment and three hand tools. Many "PE-KO" owners tell us that

the HAND TAMP

alone is worth the price of the entire outfit. "Frozen," rusted rims are easy to handle on "PE-KO."

Order thru your Jobber or get descriptive circular listing "PE-KO" advantages.

$58.00 Complete—Higher West of Denver

PEKIN FOUNDRY & MFG. CO.
222 Sabella St., Pekin, Ill.

SEND!

for
a copy of this
Handy Husky Wrench Book
before you buy
another socket
TOUGH TOOLS for FASTER SERVICE

"There's a saving in buying a set of HUSKYS."
Ask your jobber

HUSKY CORPORATION,
Kenosha, Wis.
Send Husky wrench book to:
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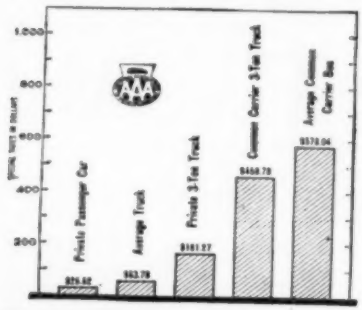
would suffer, along with practically every other business, if by any stretch of the imagination, this form of transportation were to be discontinued.

Referring particularly, of course, to motor trucks, he directed attention, among other things, to the importance of transporting vast quantities of raw material for manufacturing and for the building of highways, such material as iron, steel, coal, lumber, paint, asphalt, cement, gravel and sand.

Motor trucks have materially assisted railways in relieving difficult transportation situations. They have kept open the channels of commerce when severe storms tied up railway facilities, and when strikes threatened to seriously disturb industry and the welfare of the nation.

"Substitution of motor transportation at a cost of 30 cents per mile for railroad services on lines where the volume of traffic failed to justify the $1.75 per mile cost of such service has resulted in greater transportation efficiency,"



This chart will give you a comparative picture of average commercial vehicle taxes.

A. F. Russell, vice-president of the New York, New Haven, and Hartford railroad, declared at hearings of the Interstate Commerce Commission recently conducted in New England.

Mr. Russell stated that coordination of motor vehicle service with the regular rail service had resulted in a reduction of this heretofore unprofitable rail operation amounting to more than 30,000 train miles monthly.

Amplifying his testimony, the railroad leader described the development of motor vehicle coordination by the New Haven railroad to the point where its truck mileage exceeds 140,000 miles monthly.

Although inaugurated less than one year ago, the motor freight operations have resulted in decreased operating costs of the New Haven system, increasing the efficiency of its rail operations, and improved transportation service in the district served by the railroad. All this is, of course, reflected in lower living costs and greatly improved living conditions.

Without consideration, however, to the vital part which the motor truck plays in our own national life, the legislative bodies of many states direct no small part of their energies to scheming and planning new ways by which they can collect greater taxes from operators of commercial haulage equipment.

Studies by the National Automobile Chamber of Commerce disclose that in no case would it be possible for any truck to operate without paying, during the

(*Please turn to page 62*)

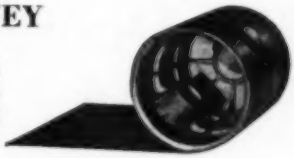
PROFIT LIFTERS

The fastest, simplest tool ever designed for removing and replacing the 2-piece valve keepers on modern "low port" motors — K-D No. 603 Valve Spring Lifter Set.

THE K-D MANUFACTURING CO., Lancaster, Penna.

MORE MILES *for* LESS MONEY

DELUXE Light Weight Cast Iron PISTONS assure longer service (75,000 miles is common), freedom from oil pumping, quick pick-up and a cool running motor. Send for folder "PISTON PROFIT."



Deluxe Products Corp., 305 Lake St., La Porte, Indiana

WANTED!

¶ On page 35 is a form, ready to be filled out. Maintenance men are urged to cooperate in joining this new form of "club."

¶ In order to become a "member" it is simply necessary to participate in these questions and answers, only when you choose to do so, of course, there is *no* fee, *no* dues, and no limitations.

¶ We would like to see every reader join. See pages 34-35.

The Editor

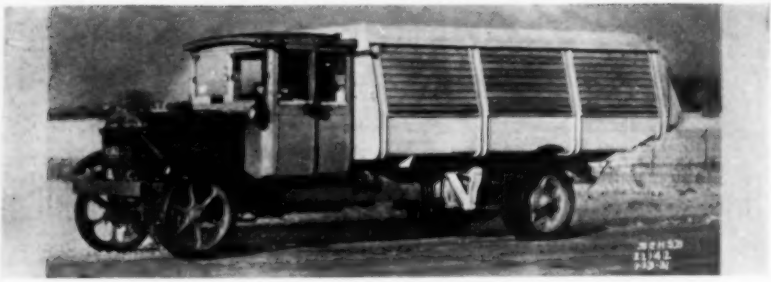
Bigger loads-fewer drivers

Make yours a heavy duty fleet with Little Giant 6-Wheelers—without adding to operating expense. Only 3 hours to install and 8 holes to drill. Two point frame contact—strong—correct balance and traction. New lower prices. Write today for full information.

Little Giant Products, Inc.

Formerly Steinke Bros. Mfg. Co.,
140 Caroline St. Peoria, Ill.

LITTLE GIANT 6-WHEELER



Doing It *Differently*

New York City Replaces Its Old Street-Cleaning Equipment With Fleet of Modern Trucks

FOR the past two years, engineers of the Street Cleaning Division of New York City's Department of Sanitation, under the direction of Dr. William Schroeder, Jr., have been working on the specifications for a new type of ash and garbage-removal truck designed to eliminate the nuisance of dust that is attendant to the old method of open-body collection. The result of their extensive and thorough research was the recent purchase by the city of New York of 204 new truck chasses, equipped with two different types of special bodies.

The specifications developed by these engineers are believed to be the most exacting ever set up as a basis for selecting motor truck equipment. Since the law requires the New York authorities to receive bids from at least three responsible concerns, their specifications cannot set up standards that are peculiar or exceptional.

All of the chasses in this order, representing an expenditure of nearly one million dollars, are the Model SCHSB Autocar chassis. The bodies for these chasses are of two types, one made by Fitz Gibbon & Crisp of Trenton, New Jersey, and the other by Wood Hydraulic Hoist & Body Company of Detroit. The order is equally divided between the two types.

The Fitz Gibbon & Crisp bodies are all metal and have a 16-yard capacity. The hoisting mechanism is the Fitz Gibbon & Crisp rotary hoist. On these bodies, the side panels are balanced by springs and roll up like the top of a desk. All these side panel openings can be opened at the same time. The tail gate mechanism is controlled from the driver's seat. The top panels or doors open on hinges by means of individual handles. These doors are used only in connection with the operation of the units as snow-removal trucks.

The bodies supplied by Wood Hydraulic Hoist & Body Company have a capacity of 12 cubic yards

FLEET OWNERS

The speed with which buses can be operated depends upon their acceleration, their deceleration and the time required for passenger interchange. **National Pneumatic Air Doors eliminate delays in passenger interchange.** Write for booklet.

NATIONAL PNEUMATIC COMPANY

Chicago **Graybar Bldg., New York** **Philadelphia**

and are elevated by the Wood mechanical hoist. The side panels slide horizontally on rollers. They are hand-operated by means of handles and pawls which are provided for each panel. Two of these sliding panels can be opened on each side of the truck at the same time. These openings are used in the normal work of collecting ashes and rubbish. The action of the tailgate is controlled from the driver's seat. These bodies are also equipped with top panels for use in connection with the work of snow removal.

When the first shipment of 20 of the trucks in this order was received in New York, appropriate ceremonies attended their dedication. Together with some of the old horse-drawn vehicles, the new vehicles were publicly displayed in front of the City Hall while the Sanitation Department band played "The Old Gray Mare; She Ain't What She Used to Be." The trucks were accepted on behalf of the city by Dr. William Schroeder, Jr., head of the Sanitation Commission of the City of New York and Mr. Charles F. Kerrigan, Assistant to Mayor Walker.

Several of the trucks are painted in the city's official colors—white bodies with orange trim and blue running gear. If this proves to be as serviceable as the old tan and black paint, the color scheme will be carried out on all the new trucks.

Commenting on this improvement in an important department of New York's municipal government, an editorial in the *New York Times* says, in part: "The event was certainly more deserving of celebration than many a public function staged in City Hall Park, when measured by permanent gains for the health and self-respect of the people of New York and the beauty of their city. . . . We may look forward to the eventual disappearance of that most extraordinary sight in a great metropolis—refuse wagons open to the air and distributing their contents of litter and ashes with a fine impartiality over select residential districts and tenement streets."

Heavy *Ones by* White

Three New Series of Heavy-Duty Truck Models Are Offered, With Six-Cylinder Power Plants

THREE new series of six-cylinder truck models, providing a comprehensive line of chasses ranging from 15,000 to 32,000 pounds gross weight rating, to cover the medium, heavy-duty and super-heavy-duty fields, are announced by The White Company, truck manufacturers of Cleveland, Ohio.

These series of new models are combinations of units of proven capacity and dependability, so arranged that they will meet all hauling requirements with high speed operation, more pay-load capacity and low operating cost in dump truck work, fast freight hauling, oil field operations, tank trucks for oil, milk, etc., and heavy tractor installations, according to The White Company's engineers.

Eight new chasses are included in the three series as follows: 640 Series, four models from 20,000 to 32,000 pounds gross weight ratings, which is greater than has ever before been available in a White truck; 630 Series, two models from 20,000 to 24,000 pounds; 620 Series, two models from 15,000 to 18,000 pounds.

Ruggedness of chasses with an abundance of power to move heavy loads at sustained speeds are among the many features claimed for these new models. Other features include powerful six-cylinder, seven-bearing crankshaft engines; four wheelbase options for each series; four-wheel air brakes on the 640 Series and four-wheel hydraulic brakes on the 630 and 620 Series; balloon tires; cam-and-lever steering gears complete electrical equipment; electrical or mechanical fuel pumps and 50-gallon gasoline tanks; heat treated re-inforced pressed steel frames.

Rear axles are all of the full-floating type and in the 620 Series are of the single-reduction type. A single and dual-reduction type is offered in the 630 Series and a single-reduction and two different capacity dual-reductions in the 640 Series. *(Please turn to page 58)*

Sterling *Revises* Models

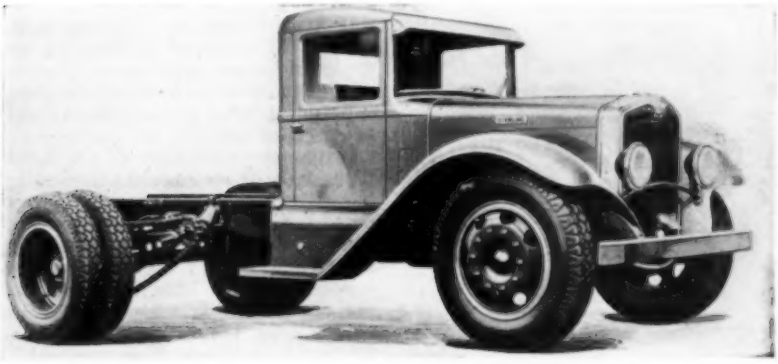
Entirely New Line is Offered in Various Drives; Four-Wheel, Chain-Drive Unit Featured

AN entirely new line of motor trucks has recently been announced by The Sterling Motor Truck Company, Milwaukee, Wis., which includes 29 different models of various capacities from ¾ to 12 tons. A broad variety of wheelbase lengths is available, in bevel, worm, double-reduction, chain and dual drives, for commercial and dump hauling. In addition to the mechanical features, the appearance of these new trucks has been greatly improved. Prices range from $795 to $12,000. Space does not permit a detailed description of the entire line, so the following summary may suffice:

Among the bevel-drives are offered six models from ¾-ton to 4-tons capacity. The most popular of this type is the Model FB-30, which lists at $795 and is powered by a 6-cylinder engine. It has a 6-inch frame. Timken axles, Budd steel wheels and other truck features. Other models include chasses up to 4 tons on wheelbases of from 142 to 204 inches, having hydraulic four-wheel brakes and boosters on the larger ones.

Five double-reduction drive, speed trucks of medium to heavy carrying capacities are offered on wheelbases from 126 to 222 inches. Tonnage of these models ranges from 3½ to 10½ tons, some of which have air brakes. Four of these models are supplied as tractors and also dump units as well. Those that do not have air brakes are equipped with four-wheel hydraulics, with boosters on each.

In the worm-drive line, four mod-

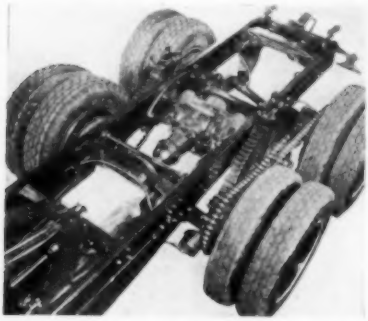


New chain-drive Sterling dump-chassis with wood-lined frame.

els are offered. The axles are by Timken and disc steel wheels by Budd. All engines have the Ricardo red head combustion chambers. Tonnage capacities range from 4 to 10½ tons, while wheelbase lengths vary from 126 to 230 inches. These models are suitable for tractor, dump and commercial hauling. Hydraulic or air brakes are obtainable.

Seven chain-drive models, from 5 to 10 tons are offered. All models have four-speed transmissions and can be equipped with the Sterling patented auxiliary transmission which gives twelve forward speeds, at slight extra cost.

An entirely new principle in four-wheel, chain-drive units is introduced at this time by Sterling, having been patented. With this new unit, both sets of rear wheels are driven with but one jackshaft, with the springs, wheels, radius rods and chains moving about a single common center. It provides, according to the makers, perfect differentiation for all wheels with perfect division of power for each wheel. The driving unit is compact and has gone through many tests, including one where it hauled sand each day for weeks, carrying 15 tons on the truck and 10 tons each on two trailers, making a total load of 35 tons at an average speed of between 16 and 20 miles per hour. This unit is supplied in three sizes at optional wheelbase lengths. Westinghouse air brakes are standard equipment.



The new four-wheel chain-drive offered by Sterling

In addition to the dual chain-drive, Sterling also offers a complete range of dual worm-drives, all equipped with Westinghouse air brakes and on optional wheelbase lengths.

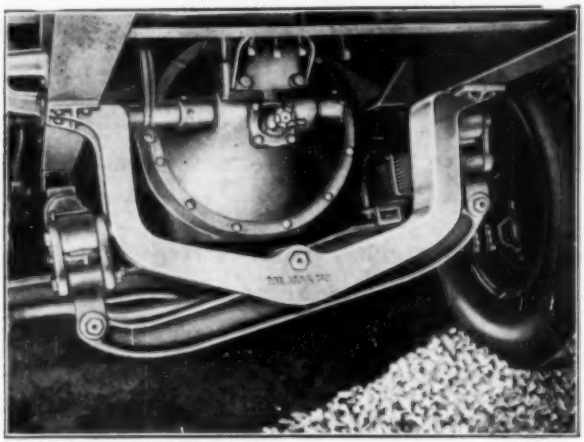
On practically all models the patented wood-lined frame is featured, consisting of deep-sectioned frames into which are pressed solid seasoned oak planks. Ball and socket radius rods are used on all models except the two light ones, which have Hotchkiss drives. The larger models have cam-and-lever steering gears. All steering wheels on these new trucks are set at a 45-degree angle.

The new Sterling cab is offered at additional cost. It is made of steel over wood sills and is fully insulated. Both seats and backs are adjustable. On the larger models, gasoline tanks are mounted on each side of the frame, enclosed by steel aprons. The larger models are so designed as to make them readily adaptable to six-wheel attachments, to permit greater payloads than their rated capacities.

Instrument panels are of the latest type, with all instruments housed in one panel and electrically illuminated. Channel bar bumpers and dual tires are standard equipment on all models except the two lightest ones. Interesting booklets describing the entire new line are now available. Your request to the Editor, or Sterling Truck Company, Milwaukee, Wis., will be promptly taken care of, without obligation.

New Spring Mounting *by* Hug

Front Spring Rocker Permits Greater Flexibility and Eliminates Twisting on Uneven Ground

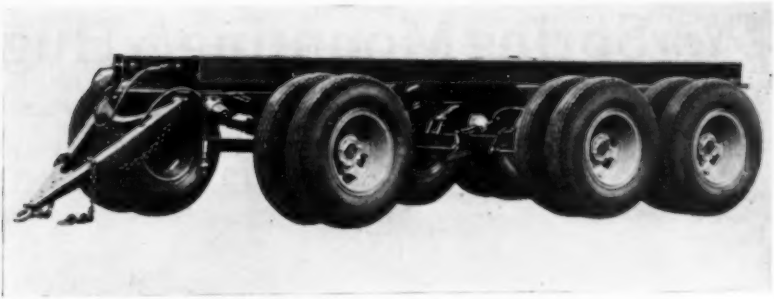


INTRODUCING an entirely new principle in front spring mounting design, The Hug Company, of Highland, Illinois, manufacturers of road building trucks and equipment, has just announced and put into production on its Roadbuilder trucks a newly patented device known as the Hug Front Spring Rocker, designed to eliminate the undesirable features of conventional front spring suspension in road building trucks.

The front spring rocker is simple in construction and practical in operation. It is made up of an assembly consisting of a special cross member or rocker bar attached to the rear ends of the two springs by means of double-action spring shackles. The cross member is in turn connected in the center to a special U-type rocker bar equalizer, thus allowing the front axle to rock under the frame without twisting or distortion.

The chief advantage in the use of the front spring rocker, as pointed out by Hug engineers, lies in its application to trucks operated over uneven roads and more particularly to trucks used in excavation and road building. The use of the front spring rocker eliminates twisting, bending or breaking of frame rails; breaking of motor supports or hangers; or twisting of cab, radiator or hood. The extreme stresses and strains to which the conventional type of truck is subjected in road building work, with their resultant

(Please turn to page 58)



Trailers *by* G. M. T.

Truck Maker Enters Trailer Field With Complete Line of Full and Semi-Trailer Models

GENERAL Motors Truck Company, Pontiac, Mich., has announced its active entry into the trailer field with a complete line of standard models, semi-trailers, 4-wheelers and 6-wheelers. It is the first truck manufacturer of major importance to add such a line of trailers to its regular product.

The move offers interchangeability of many parts, between trucks and trailers of General Motors Truck manufacture, according to the announcement. Wheel bearings, hubs, wheels, springs, shackles, radius rods, brakes, etc., are among the parts which will be identical in trucks or tractors and trailers of similar design.

The trailer line will be built in the Pontiac, Mich., factory and marketed through the existing branches, distributors and dealers of General Motors trucks. The definite advantage to representatives of the truck company, in that they now will be able to figure on the total equipment needs of prospects who use trailers, is apparent.

There will be four drop-frame type semi-trailers in the G. M. T. line, with nominal capacity ranges of 3 to 5-tons, 5 to 8-tons, 7½ to 12-tons and 10 to 18-tons. G. M. T. semi-automatic type fifth wheel of standard design has been adopted, which can be coupled with GMT, Fruehauf, Martin or Highway semi-automatic types of semi-trailers and also the Highway full automatic semi-trailer. BK booster, Westinghouse and Warner Electric brakes will be available.

Three 4-wheel jobs will have these nominal capacity ranges: 3 to 5 tons, 5 to 8 tons and 7½ to 13 tons. They will be standard as non-reversible but will be available, also, as reversible types and with BK Booster, Westinghouse or Warner Electric brakes. The 6-wheel model will be

(Please turn to page 58)

New Truck Bodies by Ford

Variety of Body Types to Meet Many Lines of Business Offered on Both Ford Chasses

SEVERAL new truck body types, especially adapted to the needs of municipalities, have just been introduced by the Ford Motor Company. They include—garbage dump trucks, police patrols, ambulance, and service car, all mounted on the Model AA one- and one-half-ton truck chassis.

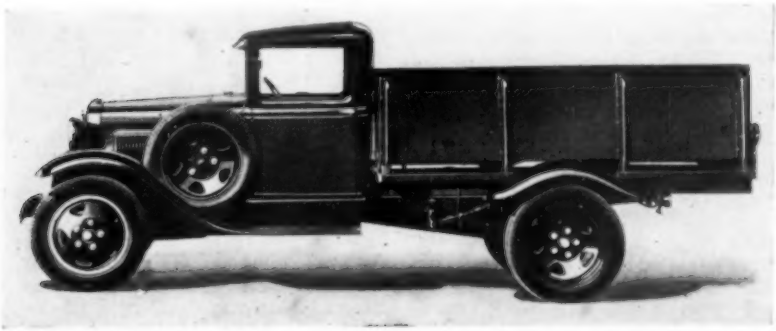
The garbage truck, built for either two or three cubic yards capacity, is made of steel reinforced and welded at all joints. The load is dumped by means of a heavy hydraulic hoist controlled by a gear shift lever in the driver's cab.

Two police patrols—a standard and a de luxe—are among the new Fords. The standard patrol has seats that run the length of the body and that may be folded down flat, meeting in the center and forming a bed to accommodate two persons. A heavy roller curtain may be pulled down to close the opening at the rear. The de luxe patrol has provision for carrying firearms in the roof of the driver's compartment and includes a stretcher and spaces for blankets, medicines, bandages, etc., among its equipment.

The Ford ambulance has a large door in the rear and a door on either side of the body behind the driver's compartment. A large window on each side is made of a single piece of shatter-proof glass. Equipment includes a cot, auxiliary seat, fan, heater, and medicine cabinet.

Municipalities servicing their own fleets will be interested in the Ford service car on which any type of block and tackle or hoisting equipment may be readily installed.

Several new truck body types, es-



New ice-body on Ford Model AA 131½-inch wheelbase chassis.

pecially adapted to the needs of contractors and builders, have just been introduced by the Ford Motor Company. They include regular and heavy duty hydraulic dump bodies, standard and heavy duty express, also stake and platform trucks, all mounted on the Model AA one-and-one-half ton chassis and available with dual rear wheels.

The hydraulic dump bodies are 84 inches by 60 inches with 14½-inch sides. They are made of 10-gage blue annealed steel. The end gate is double-acting and is controlled by a manual control lever near the cab. When the clutch is released or if the motor accidentally stalls, the hoist locks instantaneously in any position, regardless of load.

The heavy-duty express is designed for a large number of hauling purposes where the load does not require full protection from the weather. The body is of steel over wood, the sides being eighteen inches high with wide flareboards. Extra wide fenders are provided for dual rear wheels.

Stake and platform bodies, with either open or closed cabs and with either 131½-inch or 157-inch wheelbase, are also included in the standard line of Fords.

Several new truck body types adaptable to the needs of bakers, have just been introduced by the Ford Motor Company. They include panel bodies on both the Model A light commercial car chassis and the Model AA one- and one-half-ton truck chassis. Racks are easily installed.

The Model A panel delivery is especially suited to the delivery of small loads. Double rear doors, each with a small window, open almost flush with the sides. There is a dome light in the body. Seats, upholstered in artificial leather, are of the folding type. The Model A de luxe delivery is designed for use by exclusive shops that require distinctiveness in their delivery service. The body is all steel with bright metal parts of rustless steel. There is a single wide door at the rear.

On the Model AA chassis with 131½-inch wheelbase there are a panel body and a de luxe delivery body. The de luxe delivery may be had with full-length rear doors or a tail gate with double doors above. Affording more load capacity is the large panel body on the 157-inch chassis. This also may be had with wide double rear doors or tail gate.

Literature has been prepared that describes all these new special types, and can be obtained by writing to Ford Motor Company, Detroit, Michigan.

Experienced Maintenance Supervisor Available

A PRACTICAL maintenance man, with over six years' experience in operation and maintenance of motor trucks and buses now seeks a connection with transportation or vocational fleet.

In addition to practical fleet maintenance, have had considerable machine shop experience and technical training. Was previously supervisor of Eastern public utility fleet of eighty vehicles.

Desire to connect with concern in vicinity of New York City. Complete details as to ability, previous accomplishments and references available on request or interview.—Address communications to Editor, THE FLEET OWNER, 90 West Street, New York City. All replies will be held in strict confidence.

The Trouble Shooter

A DEPARTMENT devoted to correspondence from readers of THE FLEET OWNER. Any questions having to do with fleet maintenance will be answered. All properly signed inquiries will be replied to by mail and such of them as are believed to be of interest to other readers will be published in these columns.

Address your questions to the Trouble Shooter Editor. We must decline to reply to correspondence not signed with the writer's full name and address.

Replace the Clutch Spring

Question: In a recent issue I read with interest the article on Clutch Servicing. I recently repaired a Borg & Beck model 9Q clutch in a truck, in which I took the clutch down and replaced the clutch facings and pressure plate which were quite worn.

Now the clutch slips on the road at speeds over 25 miles per hour and when you step on the gas hard. I have come to the conclusion that the three springs on the pressure plate that press against the three pins in the flywheel are too strong for the main spring of the clutch and cause the clutch to slip. I would like to know what is the correct compression in pounds of the main clutch spring in this job and also what you think my trouble can be.—H. K., Plainfield, N. J.

Answer: We believe your trouble to be caused by a weak clutch spring, inasmuch as you seem to have replaced the clutch plate and facings but did not replace the spring. We do not believe that the strength of the three small springs is sufficient enough to counteract the tension of the main spring. Try a new spring in this clutch.

The correct pressure of this spring when compressed to 1¼ inches should be about 225 pounds. Be sure to lubricate the clutch sleeve with some heat-resisting grease so that it will not stick on the shaft and cause slipping.

In order to tell whether your clutch really slips or not, we would advise you to set the brakes, shift into high gear, speed up the motor and engage the clutch. The clutch should stall the motor quickly, if it holds well. If it slips you will note that the motor does not stall right away.

Thanks for the Advice!

"I notice in a recent issue that a reader has been having some trouble with Plymouths and De Sotos being hard to start. I find the same trouble with a De Soto here and here is my remedy, for the benefit of other readers:

"Hard starting on this particular car has been corrected by cleaning the secondary wire terminal at the distributor. This terminal in this

case, becomes corroded every two months, requiring cleaning and coating with a little vaseline. I have found this fairly common on the De Sotos and Plymouths with which I have come into contact. In some instances I have found gummy contacts in the ignition switch, which is found in the base of the coil."—J. A. N., Milwaukee, Wis.

Simple Plug Trouble Remedy

AFTER considerable investigation, the chief engineer of one of the largest spark plug manufacturers reports that a simple cleaning of the spark plug porcelains with a clean, dry rag, has solved at least 80 per cent of so called spark plug troubles.

"Few people realize," he says, "that a spark plug can be shorted simply by drawing an unbroken line with a pencil from the brass terminal at the top of the plug down to the steel shoulder—a distance of less than one inch. This fact clearly indicates that spark plugs can be shorted, even when otherwise in good condition.

"The reason these complaints have become greater in recent months is due to the rapid growth of quick washing systems, fast cooling fans, dirtier road conditions and an increase in the amount of "traffic film" especially around cities. All of these tend to deposit a film of foreign matter on the porcelain, which in time will short the entire plug, or weaken its spark.

"Service men in every fleet garage should be instructed to wipe off the spark plugs of every car brought in, particularly after it is washed. This should be done regularly—at least every 1,000 miles, or when the car is lubricated. A lot of good will result from this simple precaution and much lost time will be saved."

Even a Child Can Adjust It

Question: What is the proper adjustment of the carburetor on the 1930 model Graham cars? We know that if the engine spits, the mixture is too lean and that if it gallops or rolls, it is too rich. Is there any special adjustment?—H. C. H., New London, Conn.

Answer: Graham employs a one-adjustment carburetor which may be regulated by a novice. At the base of the carburetor is a metering pin. When turned to the right, the pin cuts down the gas mixture. When turned to the left, the mixture is richened. For proper adjustment it should be turned slowly to the right until the engine begins to miss, and then to the left very slowly until it fires evenly on all cylinders.

This is the only adjustment needed and regulates the gasoline-air ratio throughout the engine ranges. When the engines idles properly, the carburetor is set for maximum performance and economy.

According to Graham engineers, this carburetor operates on the automatic expanding principle, to vary automatically at high or low speeds. Variations in altitudes or temperature do not affect its performance. At high altitudes the lighter air is compensated for by the resistance of the vanes. The proportion of gasoline to air is thus automatically maintained. Ups and downs in temperature have the same effect as higher and lower altitudes.

The Rings Have Tongues

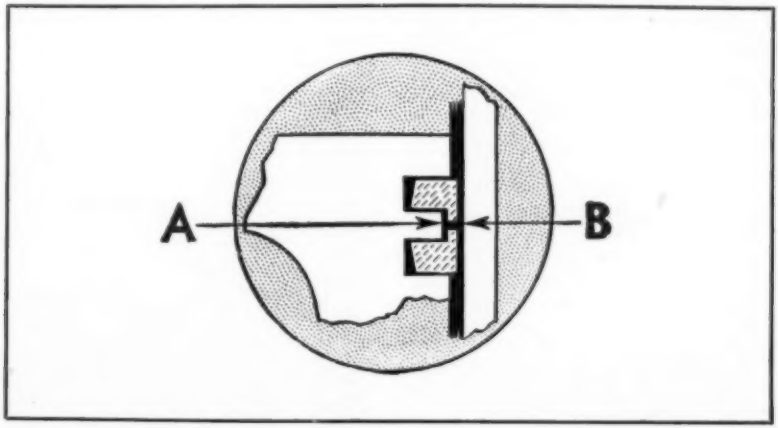
Question: I am working on a De Soto Eight and on taking the pistons out have run across a queer looking type of piston ring. This ring has an extension or tongue on it which fits into a recess in the piston. They seem to be installed in pairs. Please inform me whether or not this ring is standard equipment or something special that has been put in. I would also be glad to know more about the ring itself, and what it is supposed to do. Would you suggest that I get new rings of this type, or can I use regular compression rings? —New York City Subscriber.

Answer: The rings in your De Soto Eight are a recently developed type, which have been adopted by several manufacturers including Dodge, De Soto, Chrysler and Hupmobile. They certainly are standard equipment in your car, and are called "Tungtite" compression rings. The manufacturer of your car recommends that these rings be replaced with rings of the same type, and we believe that your jobber carries them in stock.

These rings are always used in pairs. Each ring is counterbored on one edge, forming an "L" shaped cross section. The rings are installed in a special ring groove with the counterbored edges facing each other.

The groove to accommodate these rings is machined with an annular projection or "tongue" in the center, which is lower than the outer walls of the groove. This tongue occupies the space between the counterbores, separating the rings, and forming a "T" shaped cavity between the rings, which acts as a reservoir for oil as illustrated on the accompanying drawing, at A and B. The opening between the rings is a narrow passage, which forms a direct communication between the oil film on the cylinder wall and the reservoir behind the rings.

The manufacturers recommend that when it becomes necessary to replace the rings on a car that is Tungtite-equipped, that the same type of rings be used.



The Right Brake Lining

Question: We are relining the brakes of a Dodge half-ton truck, 1929 model and note that the old brake lining which we are taking off is of the woven type. It is our opinion that this should be moulded lining and will you be kind enough to recommend the proper lining to us. Also can you send us a list of the popular cars and trucks showing what type of brake lining is best for each?—H.V.S., Providence, R. I.

Answer: You are correct. The truck in question should be equipped with *moulded* brake lining for best results. It is of course not within our duties to recommend any particular make. That is for you to decide.

In reply to your request, we are sending you under separate cover a booklet that recommends the proper type of lining for each type of brake, on all popular cars. If you will keep this on file you will find it very convenient for future use.

(Editor's Note: We sent this reader a copy of a booklet entitled "Brake Lining Replacement Recommendations." Should other readers desire copies, they will be sent free of charge on request. Address The Editor. This is not a catalog, but a valuable guide in brake work.)

Air Doors for Busses

A NEW and interesting booklet, entitled "Why Air Doors for Busses" has recently been brought out by National Pneumatic Company, Graybar Bldg., New York City. Fleet operators in this line of business are invited to send for free copies which will be sent without obligation. The Editor will get a copy to you, if you prefer.

A Practical Viscosity Test

A VERY useful and profitable guide to fleet maintenance men interested in motor lubrication from the standpoint of better motor performance and longer wear is contained in a booklet just issued, entitled "A Practical Test for Viscosity."

The booklet explains the important factors in motor lubrication, especially viscosity, and gives a scientific solution to the problem of testing the lubricating value of motor oil continuously, and while the motor is running.

Free copies of this booklet will be sent on request. Write directly to the Visco-Meter Corporation, 318 Grote Street, Buffalo, N. Y. The Editor will get a copy for you, if you prefer.

Change-Overs Made Easy

HOW fleet operators can modernize their tire, wheel and rim equipment and further reduce their maintenance costs, is outlined in detail in an interesting book entitled "Change-Overs Made Easy," recently published by Firestone Tire & Rubber Company, Akron, Ohio.

Besides giving actual instructions as to changing over from solid to pneumatic tires, it also gives comparative operating data between trucks on solid tires and those on heavy-duty pneumatics. The cost figures shown will be found very interesting.

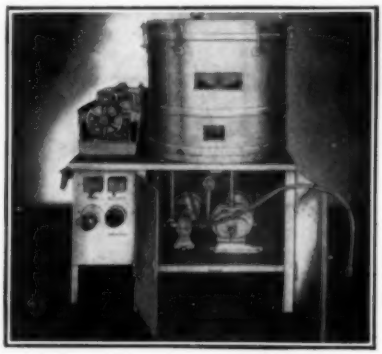
For your free copy of this helpful little book, write to the Editor of this publication, or to the Company mentioned above. A copy will be sent to you at once without obligation.

Making New Oil Out of Old

Oil Reclaimer, Developed for U S. Air Service, Is Now Available for Use of Fleet Owners

FLEET operators will be interested to learn that an arrangement has been made whereby the Miller Oil Purifier, a machine for the re-refining of used motor oil, is now being manufactured and sold by the Youngstown Steel Car Corporation, of Niles, Ohio. According to the makers, this machine was developed for and used by the United States Air Service during the World War, and together with changes and improvements, has been especially adapted for the use of fleet owners.

Fleet owners now operating this equipment, states Arthur E. Wilkoff, chief engineer, are re-refining crankcase drainings that were formerly thrown away as valueless, and that the re-refined oil tests equal, or better than, the original new oil, with respect to lubricating qualities and service obtained. Oil costs, accordingly, have been reduced from 60 to 75 per cent, depending on the price paid for new oil.



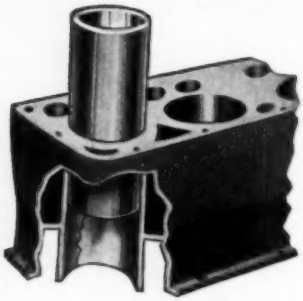
A brief description of the machine, as furnished by the manufacturers, follows: Three contaminating elements in used oil—dilution, dirt and acid—are removed. The used oil is poured into the purifier from buckets, or it can be pumped in, by using the motor-driven pump with which the machine is equipped. Electric heaters and blowers then heat the used oil, atomizing and aerating it until a temperature is reached that removes dilution. The vapors pass out through a condenser and are collected for use as a penetrating oil.

The operator then adds a package of a powdered compound which penetrates through the oil and reduces excess acidity and at the same time collects carbon held in suspension. The motor-driven pump then forces the oil through a filter-press which removes all contamination. A ten-gallon batch can be run through the machine in a little more than two hours, the oil in this period having been completely re-refined, ready for use.

A booklet, which can be obtained free of charge on request, contains full details of construction, operating cost data, actual cost of re-refined oil, etc., including cost of the machine itself. If interested, the Editor is arranging to handle requests for the same; if you prefer, you can write directly to The Youngstown Steel Car Corporation, Niles, Ohio, attention of Mr. Shearer. No obligation, of course, either way.

What YOU New Products of Interest

Dall Cylinder Sleeves



A NEW product is announced by Dall Motor Parts Company, Cleveland, Ohio, consisting of a line of finished and semi-finished cylinder sleeves, covering a complete line of truck, bus and passenger car engines, and carried in stock at all Dall branches, assuring over-night service everywhere.

The sleeves are cast in the same foundry as is the well known line of Dall cast iron (semi-steel) pistons. They conform to a special S. A. E. analysis, free from porosity, making an ideal material for this product. Each sleeve is packed in an individual carton and labelled according to size, etc. Sizes can be furnished from 2⅝ to 6½ inches.

The semi-finished sleeves are designed for those who wish to finish them in their own shops. One end is centered, enabling the sleeve to be finished for installation quickly and accurately.

The finished sleeves are ground on their outside diameters, with the centered end removed. They can be quickly installed. An allowance is made for a "press fit." In installing the mechanic simply bores out the cylinder .250 inches oversize and presses in place. A circular has just been issued that lists and prices all sizes of sleeves carried in stock. It also gives complete directions for machining and installing. For your free copy write to the Editor, or directly to Dall Motor Parts Co., Station D., Cleveland, Ohio.

G. E. Handy Cleaner

A NEW Handy Cleaner has recently been announced by General Electric Company, Merchandise Department, Bridgeport, Conn. It supersedes Model 85 and has been redesigned throughout. It is called Model 96.

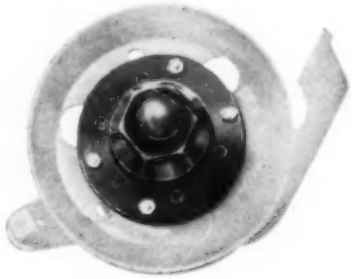
A deodorizer attachment is provided, for banishing foul odors, repelling insects and keeping moths from upholstery and clothes. The net price of this attachment is $1.00.

Among the new improvements and features as announced by the manu-

WANT *to* KNOW

facturer are the following: larger air-cooled universal motor that needs no oiling; ball bearings packed in lubricant; 25 per cent greater suction; dust-proof bag; stationary self cleaning brush; new all-rubber cord; unbreakable moulded rubber plug; longer nozzle with rubber bumper to prevent marring woodwork. The list price, East of the Rockies, is $14.50.

Universal Joint Puller



THE C. & H. puller, illustrated here is designed to remove the flanges of all popular types of Spicer universal joints, without warping or injury to the flange or shaft. It is manufactured in various sizes, by the C. & H. Manufacturing Co., 24 N. Elwood St., Tulsa, Okla.

This tool is made of high grade steel and is faced and drilled to fit the companion flange of the Spicer joint. Two types of this puller will fit many passenger cars and several of the trucks, as well. Ample material and space is left to be drilled out by the mechanic to take care of some of the less popular sizes.

In operation, the body of the tool is bolted up to the companion flange of the joint, and the set-screw turned in against the shaft, forcing the joint off.

Literature and prices will be sent on request without obligation. The pullers are said to be big time and money savers, and were designed by a practical fleet maintenance man.

Self-Oiling Bearing Metal

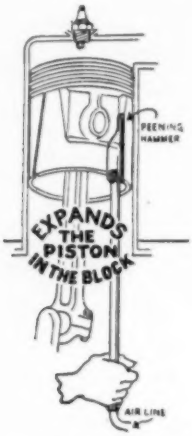
A SELF-OILING bearing metal that will eliminate squeaks and excessive wear has been developed by Chrysler engineers, according to a recent announcement. It is called "Oilite."

The new metal is an alloy of copper, tin and other metals, subjected to tremendous pressure, heat treated and then impregnated with hot oil in a vacuum. It is said to absorb 40% of this oil, by volume, and its high oil content may be proved in many ways. If squeezed in a vise, for instance, it will drip oil. If subjected to a slight pressure when filled with water, oil is forced out. Even so slight a rise in temperature as occurs when it is left to stand out in the sun will cause oil to seep out.

Some of the actual applications which the new metal is suited for include spring shackles, steering gears, water pumps, clutch pilots, and other positions.

New Tool Removes Piston Slap

THIS is a new tool designed to eliminate piston slap without removing the pistons from the engine. It is a compressed-air peining hammer that can be used to scientifically expand the piston at the skirt, operating from underneath the car when the oil-pan is removed.



As shown in the accompanying illustration, the pneumatic peining hammer is inserted inside the piston from beneath and operates on the garage's compressed air line. A conveniently long handle with thumb control enables practical operation. The tool works equally well on all types of aluminum pistons and the original seating of the piston ring in the cylinder is undisturbed.

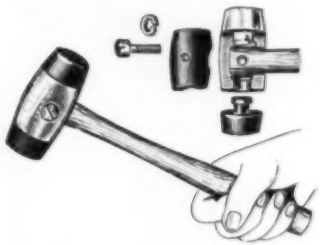
The complete tool kit, as offered by Watervliet Tool Company, Albany, N. Y. includes a magnetic trouble lamp, set of feeler gauges and two different hammer-heads for use on both invar-strut and split-skirt types of alloy pistons.

An interesting circular has been issued that describes this new tool in full detail. For complete details write the Company mentioned above; or, if you prefer, the Editor will be glad to see that you are promptly taken care of.

Husky Soft-Tip Hammer

THIS hammer, a product of The Husky Corporation, Kenosha, Wis., is equipped with interchangeable heads of rubber, composition, lead and copper. Its main advantage, according to the makers, is its ability to deliver a heavy blow without damage.

The head members are steel forgings and they lend the weight and balance to make the blows effective. There is no rebound, even when the rubber tip is used. The hammer itself is simple in construction and any of the tips can be attached in a few seconds' time.



Around the shop this hammer can be used for body and fender repair work, radiators, tires, fitting of new or reground parts and all kinds of sheet metal or woodwork. Catalog and literature on request. A catalog covering a complete line of Husky socket wrenches is also available. The hammer, as well as other Husky products, are sold through jobbers.

Test Gasket Offered Free

AN interesting and novel free offer on gaskets is now being made by Felt Products Company, 1511 Carroll Ave., Chicago, Ill. Here is just what you have to do to obtain your free sample:

Send to the above Company a sample of the worst gasket you are now using, stating the difficulty you are having in keeping it from blowing out or becoming otherwise defective. If this gasket is easily identified by name or number, it is not necessary to send the sample; just state the make, model and year, of the vehicle and the gasket location.

As with all free offers that are made through this publication, there is no obligation to buy anything, nor are there any other charges in connection with same. This Company offers something *new* in the line of gaskets that will interest every maintenance man.

Cylinder Head for Chevrolet

A LINE of replacement cylinder heads for Chevrolet motors has recently been introduced by Bates-Wohlert Company, Lansing, Mich., makers of the well-known "Bates" flywheel starter gears.

The Bates heads are made from a special electric furnace iron of very close grain and high tensile strength, according to the makers, this material being composed of about 20 percent steel.

Advantages claimed for the new line of heads are that they are remarkably free from tendency to strain and warp; that valve seats will stand up longer; and that they are accurately machined.

Fleet owners are invited to write to the Company for full information and price list.

New "Cheat-Proof" Governor

ONE of the pioneer manufacturers of governors for controlling the speed of automotive vehicles, the Klemm Automotive Products Company, 1302 N. Halstead St., Chicago, Ill., offers a governor that is said to be foolproof.

Klemm governors have been used by some of America's most prominent firms operating large fleets and the new governor, illustrated here, gives the owner or superintendent positive control, at all times, of the speed at which he wants his vehicles driven.

One of the exclusive features of the new "cheat-proof" governor is the key control, making it impossible for the driver of the vehicle to alter the speed at which the governor is set. Models are available to fit all motors. Inasmuch as governors prolong the life of both motor and chassis, as well as save tires and brake linings, every fleet operator should be interested.

The device is offered on a 30-day free trial, and is sold by leading automotive jobbers; or you can write to the manufacturer mentioned above.

Heavy Ones by White

(Continued from page 42)

Power take-offs for auxiliary drives can be furnished and six-wheel installations are available in the larger models. These new models offer not only the most modern of mechanical features but provide complete coverage of the medium and heavy duty fields with varying performance characteristics so that every operating requirement can be served with a unit specifically adapted to their service.

Should further information be desired concerning any of these new models, you are invited to correspond directly with The White Company, Cleveland, Ohio.

New Hug Spring Mounting

(Continued from page 45)

wear and tear on equipment and the subsequent loss of time for repairs, has for years been a major problem to owners using their trucks in road building and excavation work.

Now, according to Hug engineers, the problem is being solved through the use of the Hug front spring rocker. The new device, an exclusive Hug feature, was developed by C. J. Hug, president of the company, and his staff of engineers, after a number of years of exhaustive experimentation, plus Mr. Hug's many years' experience in roadbuilding, prior to his entry into the truck field.

During the recent American Road Builders Association Convention held in St. Louis, a number of Hug Roadbuilder trucks featuring this new device were on exhibition and attracted wide attention from those in attendance at this great road show.

Trailers by G. M. T.

(Continued from page 46)

available only in the non-reversible type and will have a nominal capacity range of 11 to 17 tons.

All models will be sold according to General Motors Truck straight rating capacities (range 8000 lbs. to 45,000 lbs.)—total allowable gross weight including body and load—just as is the truck line.

The trailers are engineered throughout according to General Motors Truck standards, and in line with recent developments of trailer construction. Frames are sturdy and reinforced with cross members. Auxiliary springs are provided on all models. Where radius rods are not used, the spring eyes are double wrapped for extra security.

Replacement Business Good

REPORT recently received from The Piston Ring Company, Muskegon, Mich., makers of Quality Brand piston rings, reveals a marvelous increase in replacement sales for the first two months of this year. Total sales for replacement, which includes fleet operators, were 132 per cent greater than the corresponding two months of 1930. Stimulating information, indeed.

The Company's latest product, the Super-Drainoil ring, was announced in our last issue. A complete piston ring size book is available from this company. If you want a free copy, write to the Company, or the Editor. No obligation, of course, either way.

Caring for Emergencies
(*Continued from page 30*)

roughly into three general compartments—one large compartment in the center and compartments on each side over and in front of the rear wheel housings. The towing bars and a large assortment of tools are carried in the side compartments. In the central compartment there has been provided space for about a cubic yard of sand. This sand will be carried both to supply weight and will be used in sanding the road wherever it may be icy, or wherever super-elevated curves cause side-slipping. A special "sander" was built by the company and may be seen in the accompanying photograph, mounted in the center of the truck under the chassis. This "sander" is so constructed that it will throw sand over the whole road when in operation.

The truck is equipped with a power-winch mounted under the rear of the frame, and directly in the rear of the winch is a large sheave. This sheave is so mounted that the cable may be run from the winch either straight to the rear, or may be run over the sheave and then through the pulley in the overhead I-beam. The winch carries 300 feet of ⅝" cable and is capable of approximately a 15-ton straight pull. The winch has two speeds in one direction and one in the other.

An 8x4 inch I-beam has been mounted horizontally on arches of the same I-beam material and extends to the rear of the truck with a pulley in the end, through which the cable may be run whenever lifting power is necessary. This I-beam is laid on its side and has been bridged to provide greater strength.

Other items of interest in connection with this truck which might be mentioned are its weight without the plow, which is 12,900 pounds, and weight with the plow and all attachments, 15,000 pounds. The clearance and overhead lights on the truck may be connected through a flasher whenever that may be desirable. The lights on top of the cab may be controlled from inside the cab and turned in practically any direction.

Arrangements have been made in the central portion of the body for the installation of bunks so that the men operating the truck away from home all night may have a suitable place to sleep. A gasoline stove has been set up in the rear compartment. The cab is heated directly from the motor.

The tires are 10.50x20's and are mounted on standard Budd wheels. All four wheels are equipped with brakes. Two men will ordinarily constitute the crew of this truck, but three may be comfortably accommodated in the cab.

The Washington Motor Coach Company has recently placed this new combination service truck and snow plow in service. The main route of the Company crosses the Cascade Mountains, through the Snoqualmie Pass. The other routes of the Company run through territory where snow frequently falls to considerable depths and where in the past, coaches have in times of bad weather, been stalled for days at a time.

Self-Maintenance Pays

(Continued from page 16)

Thus a complete circuit is made for the oil to travel from crank case to refinery and back to crank case by manipulation of valves, gravity, air pressure and pumps. All tanks are in duplicate so that two separate grades of oil may be used and so valved that oil may be drawn from either tank.

The entire service shop, storage section, wash rack and grease pits are covered by a saw-tooth type of roof, fitted with windows, to provide a maximum amount of uniform light during the day time. This roof also provides adequate ventilation.

Each department is drained by gutters. These are 12 inches wide and 12 inches deep. These gutters are covered with steel grating and extend throughout the lower floor.

Heating is provided by a low pressure steam boiler and the building is so constructed that it may be readily heated to comfortable temperature in cold weather. Offices, oil room, recreation room and tire room are heated by direct radiation. The rest of the building is heated by unit heaters suspended from the ceiling. These unit heaters are of the high velocity jet type with recirculating ducts. They reach to six feet from the floor and are so placed as not to interfere with movements of motorcoaches or floor trucks. Oil is used for heating the boilers and a 12,500 gallon storage tank makes possible carload deliveries of fuel oil.

The mechanics' locker room is 27 by 30 feet and is equipped with 50 steel lockers. Wash room, showers and toilet facilities are provided in direct connection with the mechanics' room.

The gasoline storage capacity of the plant consists of three 5,000-gallon tanks installed eight feet underground with manholes to the ground surface. This allows for carload deliveries. Over these three tanks, located outside and to the rear of the building, is a concrete valve house, making all valves easily accessible and under cover in case of inclement weather. Suction and filling lines are so arranged with valves that any one or all three tanks may be filled or drawn from. On the valve house is installed an electrically-driven, remote controlled gasoline pump supplying filling stations at the grease pits and outside the building. All gasoline is metered and the pump is controlled at the service stations.

Four small air compressors are installed in parallel above the tire shop with all controls on the floor below and so arranged that any number may be operated at the same time. Air outlets are located at every possible necessary location throughout the entire building.

There are overhead doors to entrances of wash rack, service shop, storage and paint shop, a number of which are electrically operated with stations on both sides of the doors. All machines are equipped with unit drive with three-phase, 60-cycle motors. The lighting circuit is single-phase, three wire. At intervals throughout the repair shops and storage room, emergency lights have been installed which may be turned on irrespective of other lights.

All light circuits and power feeders are controlled from one central point in the machine shop, except the

lighting circuits for the second floor office lights. No wire less than 12 gauge was used. All outlets in the paint shop are water and gas-proof.

Features of the drivers' club rooms on the second floor of the building are locker rooms, shower baths, washroom and toilet facilities; a shoeshine stand where drivers may receive free puttee and shoe shines, lounge rooms, billiard rooms and inspection mirror.

The inspection mirror is a huge plate glass mirror affording the driver a full length view of his person. Painted at appropriate heights are questions calling the drivers' attention to cap, uniform, puttees and shoes. Standing in front of this mirror, the driver at a glance can give his outward appearance a thorough inspection.

R. W. Lemen, vice-president of Pacific Greyhound Lines, in charge of Oregon Stages Division, maintains his offices on the second floor.

Fritz Jacobson, superintendent of garages and equipment on the Oregon Stages Division, is in direct charge of the maintenance plant.

Flynn Named Sales Mgr.

F. J. FLYNN, for the past seven years connected with the World Bestos Corporation, Paterson, N. J., manufacturers of brake lining, has been appointed Sales Manager of the firm, according to announcement recently received. Mr. Flynn's experience in this business is unusually broad, having travelled in all parts of the country for the Company. His knowledge of the specific problems of the brake service field will be extremely valuable in his new position.

New Belden Sales Manager

H. W. CLOUGH has been appointed sales manager for the Belden Mfg. Co., Chicago, makers of quality ignition cable.

Mr. Clough has been manager of the merchandise division for three years, during which time he has developed the merchandising of Belden automotive wires and cables through jobber channels.

His promotion has come with the adoption of a new program which consolidates all Belden sales divisions under his management.

Good First Quarter for Bear

AMONG the stimulating reports that are being received of improved business conditions, may be mentioned one just coming from The Bear Mfg. Co., Rock Island, Ill., makers of wheel and axle aligning equipment. This company reports that their first quarter's business in 1931 exceeds the same quarter in 1930 by a margin of 40%.

If you have not as yet received your free "Wheel and Axle Manual" it is not too late to get one. A new edition is just off the press. Write to the Company, or the Editor. There will be no obligation, either way, and you'll find the manual something different than you have been receiving.

Charge of Users Division

THE Autocar Sales & Service Company of Ardmore, Pa., recently announced the appointment of Martin A. O'Mara as vice-president in charge of the National Users Division. Mr. O'Mara will make his headquarters in New York City and will start his new duties immediately.

Checking Truck Taxation

(*Continued from page 38*)

course of a year, at least $50.00 in taxes. That is the minimum. From that point the aggregate taxes between all trucks mounts rapidly, reaching an estimated maximum of $2000. There is, at any rate, no basis for doubting that the aggregate tax paid by any truck is ever less than 6% of its possible earnings. The common carrier not only pays the regular taxes, but in addition 34 states have special forms of taxation which they add to the burden of the "for hire" truck. Here, again, there is a diversity of tax systems.

In 7 states the common carrier fee is based on a percentage of the gross annual receipts or earnings. In one state this fee amounts to 6% of gross receipts and a gasoline tax of 5% prevails. Here certainly is a striking illustration of unjust motor truck taxation. In 5 other states operators are assessed from 1% to 5% of their gross receipts.

Another type of tax proposed is that based on annual mileage, or ton mileage. There are 11 states where this is enforced. One state charges five mills per mile; 25% additional for solid tires; another charges ¾c per mile; another 1/5c per gross ton mile, and so on down the line.

Sixteen states have common carrier fees scaled either on capacity, gross or chassis weight, or on a flat rate. These fees vary from a minimum of $6.00 to a maximum of more than $600.00.

Protests voiced by powerful organizations of commercial haulage operators have checked the tidal wave of unjust legislation in many states. Industry in all lines apparently realizes that some effective action must be taken to secure for commercial haulage that consideration in the matter of taxation which will enable it to perform, with the utmost economy and efficiency, its vital function in the distribution of merchandise. Lawmakers are being brought to recognize that the welfare of industry as well as the general public is closely interwoven with the speed, flexibility and economical service provided by the motor truck.

It is high time for the motor truck owners to make themselves felt in every state in the union. This can be done only by strong organization. As Napoleon said, "The way to insure victory is to always meet the enemy at the main point of attack with a superior force." Let's get into action with an aggressive, well-planned campaign. Start mobilizing at once and prepare to swing into the battle line a force that will carry through to victory.

New Combination Catalog

DALL Pistons and Burgess-Norton Piston Pins are cataloged in a new combination catalog compiled by the Dall Motor Parts Company of Cleveland, Ohio, and the Burgess-Norton Mfg. Co., of Geneva, Ill. It is a most complete encyclopedia of information on the piston and pin assembly and is furnished free of charge on request. Requests for for this free book may be sent to either of the above companies.

Advertising in Taxicabs
(*Continued from page 32*)

age taxi passenger will read and retain at its first appearance the message of an ad carrying 24 to 36 words of text, although ads of 20 words or less are considered most effective. The average mileage per trip for New York taxicabs is approximately two miles, and the average passenger is in the cab for 10 minutes or longer, so he sees the ad-machine's complete program at least four times.

Mr. Livingston reveals that he has had two of the ad machines in successful operation in New York for a year—one of standard size and displaying 5 x 10 inch cards, installed in a taxicab, and a larger machine displaying 11 x 21 inch cards, which was installed in one of the Fifth Avenue buses. The reactions of passengers have been carefully noted, said Mr. Livingston, and the year's record indicates that this method of advertising strikes them as interesting, diverting, entertaining, and amazingly effective.

Installation of 1,000 of the machines in the Terminal Company's fleet will be upon a long term paid-concession basis, according to Mr. Livingston. He is now completing negotiations with fleet owners in other leading cities which, he said, will result in the installation of 20,000 of the machines this year.

With reference to the taxicab as a potential advertising medium, Mr. Livingston said:

"According to the most reliable figures available, the taxicabs of New York City carried approximately 380,000,000 passengers in 1930, and had a gross income of nearly $131,000,000 plus approximately $26,000,000 in tips, making a round total of about $157,000,000.

"The taxicabs, with their 380,000,000 passengers in a year, transport more New Yorkers than the 'L,' which carried only 347,000,000 passengers in the last fiscal year; the surface railways of Manhattan, with 266,908,884; the private bus lines of the five boroughs, with 131,500,000; the municipal bus lines, with 107,500,000; the Hudson Tubes, with 110,700,000; the Long Island Railroad, with 85,272,000; the Boston & Westchester Railway, with only 9,326,000; the railway and municipal ferries, with 82,000,000 combined. The total number of railway passengers in and out of Penn Station in the last fiscal year was only 65,409,000 and of Grand Central 49,797,000; and the total in and out traffic on all railroads operating in New York City was only 273,459,000.

"The Terminal Cab Company's 1,000 vehicles, which operate mainly from leading railway and steamship terminals, averaged 870,000 trips a month with 1,200,000 passengers during 1930, this being at the rate of 1.4 passengers per trip. Their total for the year was 14,400,000 passengers.

"Investigations are now in progress to determine the actual number of taxicabs in regular operation throughout the United States. Although complete figures are not yet available, it is known that the total will run into the hundreds of thousands. Taxicabs have become an extremely important factor in the transportation systems of most American cities."

Why They Pump Oil

(*Continued from page 24*)

improper fitting, faulty oil grooves and too much clearance in the main or connecting rod bearings, either due to poor fitting or wear, which causes the oil to spurt up on to the cylinder walls.

Then again, many cases reported as high oil consumers are really not oil pumpers, but after inspection, are revealed to be because of leaks in the crankcase, rear or front main bearings, and *not* through the combustion chamber. It often happens that these leaks do not show up until higher speeds are reached, or the car is driven on the road, when they cannot be readily detected.

A great deal of oil pumping in force-feed lubricated motors is caused by worn connecting rod bearings that have been taken up and improperly fitted. When a connecting rod is worn beyond a certain clearance, the oil is forced through the bearing in excessive quantity and is thrown into the cylinder. "Taking up" the connecting rods when in this condition does not always remedy the trouble, since you only take up the clearance endwise, still leaving an excessive clearance on both sides, or at the bolt ends of the rod. Improper shimming, or worn and broken shims are also very often the cause of excessive oil consumption.

Another cause of oil pumping is seen in insufficient ventilation in the crankcase, causing an excessive pressure, which forces the oil through the bearings and also past the piston rings. We have found in many cases an accumulation of sediment in the crankcase, such as road dust, iron cuttings and other abrasives that were not thoroughly cleaned out after the engines had been reconditioned. When the crankcase is not cleaned out often enough, this heavy sludge of oil and dirt will rapidly wear down the piston clearances and rings, and clog in between the rings and lands, thus setting up a condition that allows the oil to pass very rapidly by the piston rings.

We all know that in the suction stroke we create a vacuum in the combustion chamber and if we do not have the proper seal around the piston rings, this vacuum will naturally assist in pulling the oil by the rings. Improper timing is another cause, especially in those cases where the timing is off from two to three teeth. It is plain to see that this condition will cause imperfect combustion as well as creating greater vacuum, which in turn will pull the oil by the piston rings.

Leaky valves, either due to the valves themselves, or the seats, will cause an accumulation of oil in the combustion chamber and consequently foul the spark plugs, and at the same time, if the motor is allowed to operate in this condition, it will carbonize the piston rings and cause additional trouble.

Imperfect carburetion, especially in heavy mixtures, will cause fouled spark plugs and also dilute the oil on the cylinder walls, breaking down the oil seal between the piston rings and grooves and cause further dilution in the crankcase. The oil then becomes thin and loses its viscosity and in this condition it will easily get by the piston rings and into the combustion chamber. This condition will also cause a leakage in compression by the piston rings, burn the oil (turning it into carbon) and lock the piston rings.

Ignition is another cause of oil pumping. It doesn't in the first instance cause excessive consumption of oil, but if the ignition is poor, and as a result we do not get the proper expansion of gases, it will not burn up the normal passage of oil. Continued running of the motor in this condition will cause an accumulation of carbon, which will get in between the piston rings and grooves, breaking down the seal, and will most likely cause crankcase dilution, the breaking down of the oil and finally result in oil pumping.

In past years we have had a great deal more trouble with fouled spark plugs than we have at the present time. This fouling of spark plugs in slight oil pumpers has been greatly overcome by the present day design of spark plugs. We now have what are called "hot" plugs and "cold" plugs. In cases where a slight oil pumper would cause a spark plug to foul, due to the plug running too cool, this condition has been overcome by designing a spark plug that will operate at higher temperatures, thus *consuming* a slight film of oil, rather than accumulating carbon and missing fire.

If too light oil is used, or oil of poor quality which does not have the proper viscosity and flash test, the oil will naturally break down and pass by the piston rings, resulting in an imperfect seal. In turn, the hot gasses would pass by the piston rings and carbonize the oil, thus causing a condition of oil pumping, to say nothing of the other bad effects such as premature dilution, etc.

Engines that are operated under dirty or sandy road conditions will very rapidly develop into excessive oil users, due generally to rapid wear. We know of many cases where new or reconditioned motors operated under these conditions for as short a period as three months, which then were bothered with all sorts of oil troubles. This can be prevented, or minimized, of course, by the use of oil filters, air cleaners and other similar devices.

(Editor's Note: Should any of our readers have any specific problems on the subject of oil pumping or other oil troubles, we shall be glad to handle these through our Trouble Shooters' Department, with the able assistance of the author of this article.)

Free Pin-Fitting Chart

A MOST comprehensive wall chart showing the proper piston clearances for all types of pistons is offered free to our readers. Besides this information, the chart also gives full instructions for fitting pins in the various pistons, how to use a dial gauge, how to measure cylinder bores and other handy shop kinks. Copies can be obtained directly from Dall Motor Parts Co., Station D, Cleveland, Ohio. The Editor will get you a copy without obligation, if you prefer.

New Thompson Branch Office

THOMPSON PRODUCTS, INC. announces the opening of a new large branch office at 1739 McGee Street trafficway on the ground floor of the Kirkwood Building, Kansas City, Missouri.

The branch will be in charge of George A. Magee and is intended to supply automotive parts jobbers in the central states district. Ray Swarner is manager of this territory.

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Retail Delivery Convention

THE Fifteenth Annual Convention of the Retail Delivery Association of the National Retail Dry Goods Association will be held on May 25th to 28th, at the Wardman Park Hotel, Washington, D. C.

The program will stress economy, control and efficient methods in retail distribution. The members of this Association comprise the larger department stores of this country and Canada, and their representatives attending the Convention will consist of delivery, garage, warehouse and other maintenance executives.

A usual feature of the Convention will be an exhibit of motor trucks and equipment. Full details can be obtained from Morris H. Landau, Manager, 225 West 34th Street, New York City.

H. D. Hyle Appointed

APPOINTMENT of Howard D. Hyle as district sales representative in the automotive division of the United American Bosch Corporation is announced by the Corporation's Pacific Coast division, with offices at San Francisco. Mr. Hyle was formerly connected with the Robert Bosch Company and will cover the states of California, northern Nevada, Arizona, western Texas, New Mexico, Colorado and Utah.

Opens Detroit Warehouse

THE John C. Hoof Company of Chicago have recently opened a Detroit warehouse at 4809 John R. Street. This is the eighth Hoof warehouse to be established for the convenience of distributors and users of Hoof automotive merchandise.

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